90-90-90

On the right track towards the global target

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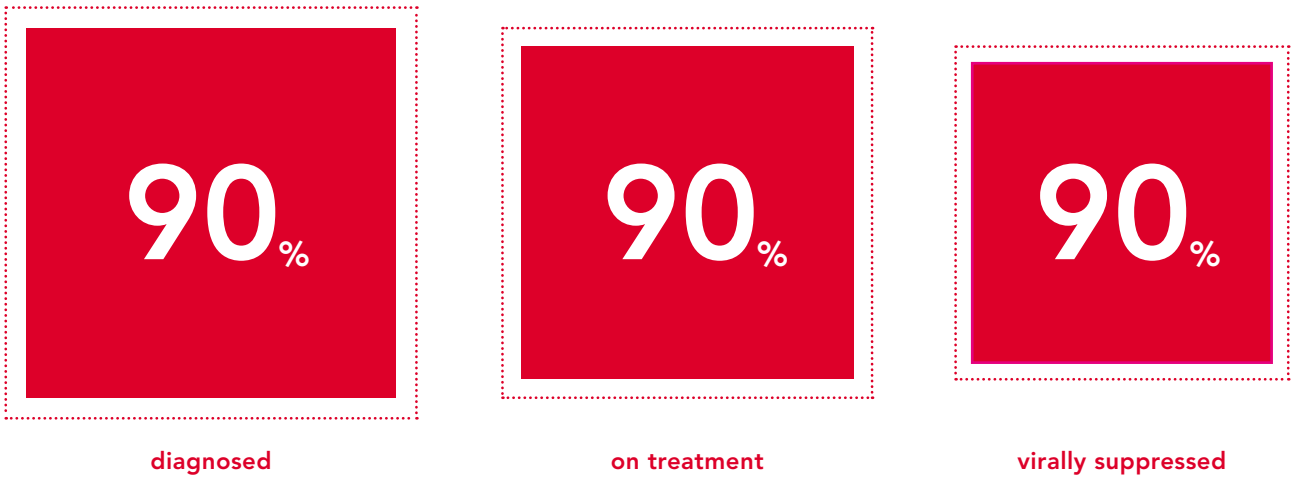
Just as the AIDS response has altered our world – demonstrating what can be achieved through international solidarity and evidence-based action – the 90–90–90 agenda has in two short years rejuvenated the AIDS response. With renewed optimism and a commitment to letting science guide our actions, the AIDS response and the broader global community have united around the goal of achieving 90–90–90* and ending the AIDS epidemic as a public health threat.

When UNAIDS launched the 90–90–90 target two years ago at the International AIDS Conference in Melbourne, it was met by scepticism in many quarters. Some observers suggested that 90–90–90 was not achievable, while others questioned the treat-all approach on which 90–90–90 is premised.

Yet, in a mere two years, initial scepticism has given way to growing confidence in our ability to reach the 90–90–90 milestone and to renewed commitment to the AIDS response. Across diverse stakeholders and regions, there is broad confidence that the world now has the means to end AIDS as a public health threat once and for all. But there is also recognition that the AIDS epidemic cannot be ended without achieving the 90–90–90 target.

Much of the renewed optimism and commitment in the AIDS response stems from the world's continuing, historic progress in bringing HIV

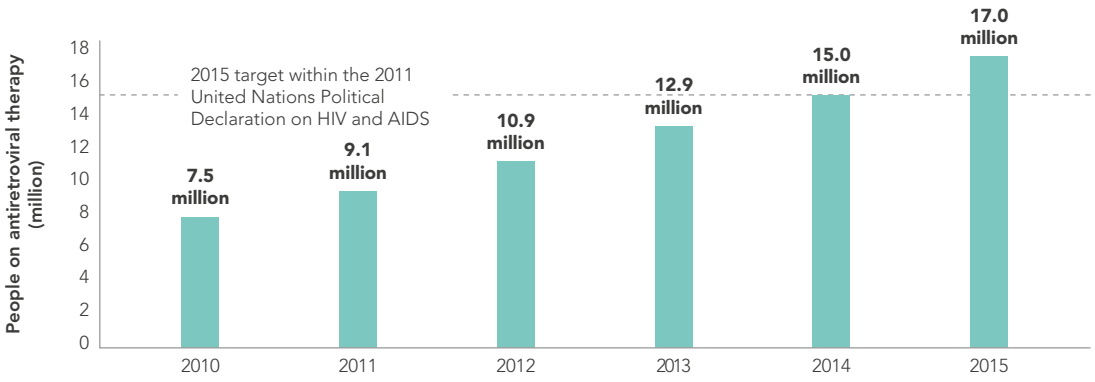
HIV TREATMENT TARGET



* The 90–90–90 target provides that by 2020: (a) 90% of all people living with HIV will know their HIV status; (b) 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy; and (c) 90% of people receiving antiretroviral therapy will achieve viral suppression.

Figure 1

Number of people living with HIV on antiretroviral therapy, global, 2010–2015



Sources: Global AIDS Response Progress Reporting (GARPR) 2016; UNAIDS 2016 estimates.

treatment to scale. Globally, 17 million people were receiving antiretroviral therapy as of December 2015 – a 1.9-fold increase in only five years (Fig. 1). While substantially fewer than 10 000 people in sub-Saharan Africa were benefiting from HIV treatment in 2000, more than 12 million people in the region were receiving HIV treatment in 2015. As a result of scaled-up HIV treatment, annual AIDS-related deaths globally fell by 45% from 2005 to 2015, including a 13% decline in the last three years.[†]

Bolstering the optimism stemming from continued treatment scale-up, new scientific evidence has further confirmed the urgent need for the treat-all approach on which 90–90–90 is premised, and intensified political leadership has focused on accelerating gains towards 90–90–90. Perhaps most importantly, an expanding number of countries from nearly every region are making important progress towards 90–90–90, demonstrating that this target, while ambitious, can be achieved by the 2020 deadline.

[†] Epidemiological and service coverage data cited without references in this report are from 2016 UNAIDS estimates.

90–90–90: A cornerstone of combination HIV prevention

The UNAIDS Fast-Track agenda envisages a combination of approaches to achieve a 90% reduction in new HIV infections by 2030(1). Of all available prevention strategies, antiretroviral therapy appears to be the most potent, as UNAIDS estimates that achievement of 90–90–90 will account for roughly 60% of all new HIV infections averted through the Fast-Track combination prevention approach(1).

To end the epidemic as a public health threat by 2030, however, the reduction in HIV transmission associated with achievement of 90–90–90 will need to be matched to a much more robust reduction in the risk of HIV acquisition(2). A 2016 review of available studies found strong evidence for the effectiveness of several biomedical prevention strategies – including voluntary medical male circumcision, pre-exposure antiretroviral prophylaxis and prevention of mother-to-child HIV transmission of HIV(3). The same review also found robust evidence for the effectiveness of interventions to increase the supply of condoms, clean needles and other prevention tools(3).

However, the same rigour and political commitment that have helped drive concrete advances towards 90–90–90 over the last two years have not always been applied to proven HIV prevention methods(2). To strengthen primary HIV prevention, UNAIDS has called for 25% of all global HIV expenditures to be allocated for HIV prevention approaches. In addition, policy and programmatic reforms are needed to address key shortcomings in prevention programmes, such as the variable quality of programme design and sub-optimal monitoring of results(4).

Further contributing to the support for 90–90–90 is the increasing recognition of the links between 90–90–90 and the Sustainable Development Goals. In the countries where steady progress towards 90–90–90 has been made, treatment scale-up is driving marked increases in life expectancy and gains in productivity. Countries and communities the world over are witnessing the transformative benefits of progress towards 90–90–90.

This report describes the coalescence of the AIDS response and the broader global health and development field around the 90–90–90 target over the last two years. It explores the key factors that have convinced the world to embark on the movement to leverage HIV treatment to help end the AIDS epidemic in the next 15 years. The report also describes how the 90–90–90 agenda is helping to improve the efficiency of treatment programmes and national responses, benefiting from and catalysing innovation, and encouraging steps to lay the foundation for long-term sustainability of treatment efforts.

Yet, while the world has made major gains towards 90–90–90, not all countries and regions are on

track to reach all components of 90–90–90 by 2020. In many countries and some regions, continuation of the current pace of scale-up will leave them well short of the 90–90–90 milestones. Indeed, for the world as a whole, the pace of scale-up of HIV testing services must accelerate if we are to reach the goal of 90% knowledge of HIV status among people living with HIV. In addition, the AIDS response risks leaving behind many of the populations most in need of treatment services, including children and adolescents, young women and men of all ages in sub-Saharan Africa, and such key populations as men who have sex with men, people who inject drugs, sex workers and transgender people.

Success is entirely feasible in the quest to achieve 90–90–90. But stronger, smarter, more comprehensive action will be needed. This report concludes with priority recommendations to continue and accelerate progress towards each of the three 90s and to address gaps and shortcomings that jeopardize the potential to reach the 90–90–90 target in all settings and for all populations.

From scepticism to commitment: 90–90–90 is now guiding global efforts towards ending AIDS

Member States gathered in New York in June 2016 for the High Level Meeting on Ending AIDS

In two short years, the 90–90–90 movement has rallied the world in an unprecedented push to end AIDS in our lifetimes. This historic effort is grounded in science, a commitment to equity and human rights, and a desire to write the closing chapter of a disease that has wrought untold suffering to women, men and children worldwide. 90–90–90 has focused diverse stakeholders on a set of measurable targets, informing the formulation of health policy, the allocation of resources, and the performance monitoring of national programmes and specific clinical sites. Even as the number of global health and development priorities has proliferated under the 2030 Agenda for Sustainable Development, 90–90–90 has refocused advocacy and renewed commitment in the AIDS response.

Global embrace of the 90–90–90 approach

In the Political Declaration on HIV and AIDS: On the Fast-Track to Accelerate the Fight against HIV and to End the AIDS Epidemic by 2030, unanimously adopted by Member States at the 2016 High Level Meeting on Ending AIDS at the United Nations General Assembly, countries pledged to achieve the 90–90–90 target by 2020. Towards this end, countries specifically committed to reach at least 30 million people with antiretroviral therapy by 2020.

Key actors across the AIDS response have adopted 90–90–90 as the foundation of their efforts to reduce new HIV infections and AIDS-related deaths. The 54 members of the African Union have formally adopted the 90–90–90 approach as the bedrock framework for efforts to end the AIDS epidemic.

In a pioneering step, the leading provider of HIV assistance, the United States of America, has strategically oriented its President's Emergency Plan for AIDS Relief (PEPFAR) around aiding countries to reach the 90–90–90 target. South Africa, home to one in five people living with HIV worldwide, has endorsed 90–90–90 as the mainstay of its national AIDS response*(5)*.

90–90–90 is also building commitment and spurring action at the local level. As participants in the Fast-Track Cities initiative, cities such as Amsterdam, London, Paris, San Francisco and New York, using the 90–90–90 cascade to measure progress and drive accelerated scale-up, are already nearing or in some cases have reached the 90–90–90 target*(6)*. More than 200 cities and municipalities, spread across all regions of the globe, have pledged to achieve 90–90–90*(6)*.

Alignment of global and national policies with the 90–90–90 approach

Over the last two years, international and national policies have been updated to support achievement of the agreed 90–90–90 milestones. In 2015, the World Health Organization (WHO) issued new guidelines to strengthen HIV testing services*(7)* and also formally recommended the initiation of antiretroviral therapy for all people living with HIV, regardless of their CD4 count*(8)*. Professional bodies in the AIDS field have also developed guidelines to speed progress towards 90–90–90*(9)*.

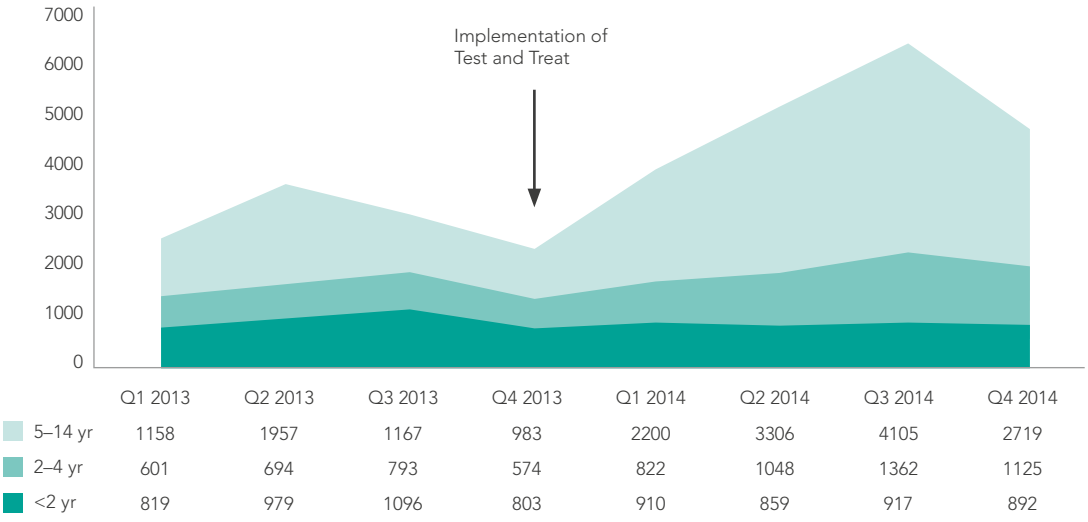
Countries have moved swiftly to put these new recommendations into place at the national level. A few short months after the issuance of WHO's new recommendations on when to start antiretroviral therapy, Lesotho in 2016 became the first African country to formally adopt the treat-all approach, followed shortly thereafter by Malawi, and countries such as Cameroon, South Africa and the United Republic of Tanzania have also pledged to implement a treat-all approach. Viet Nam is rolling out the to treat-all approach in seven provinces and among key populations. According to the International Association of Providers of AIDS Care's (IAPAC) Global HIV Policy Watch, 13 countries worldwide had by 23 May 2016 adopted WHO's recommendation for the initiation of antiretroviral therapy for all people living with HIV, and scores of additional countries are in the process of aligning their national recommendations with the WHO guidelines.

National actions to implement the treat-all approach are already having a profound effect on the AIDS response in countries. After Uganda moved to provide antiretroviral therapy to all children living with HIV, the number of children receiving HIV treatment increased by 74% in only nine months (Fig. 2).[‡] Data also suggest that a treat-all approach is improving rates of retention in care by averting the need to defer treatment among patients who are diagnosed earlier in the course of infection*(10)*.

[‡] P. Mugyenyi, Joint Clinical Research Centre, Uganda, Presentation to UNAIDS Science and Treatment Advisory Committee, June 2016.

Figure 2

Increase in number of children newly initiated on HIV treatment in Uganda following implementation of treat-all approach, 2013-2014



	Q1 2013	Q2 2013	Q3 2013	Q4 2013	Q1 2014	Q2 2014	Q3 2014	Q4 2014
5–14 yr	1158	1957	1167	983	2200	3306	4105	2719
2–4 yr	601	694	793	574	822	1048	1362	1125
<2 yr	819	979	1096	803	910	859	917	892

Sources:MOH - Uganda, May 2015

Monitoring results towards 90–90–90

As a sign of the seriousness of countries to achieve 90–90–90, important steps have been taken to strengthen and align monitoring and evaluation systems to track results at each stage of the HIV continuum of care. In collaboration with partners, WHO consolidated strategic information guidelines in 2015 into 10 key indicators, organized along the HIV continuum of care and providing a clear framework for using data to maximize linkage, retention and health outcomes. WHO and other partners, including UNAIDS, the Global Fund to Fight AIDS, Tuberculosis and Malaria, UNICEF and PEPFAR, convened 25 high-burden countries to improve monitoring of their service cascades, develop priorities and take steps to close service gaps. Countries such as Kenya are now using this data at a sub-national and county level on a monthly basis to improve service linkage and reduce gaps at each stage of the HIV continuum of care. Similarly, Rwanda has applied

the WHO-recommended monitoring framework to improve linkages in local outreach and facilities between prevention services and treatment and care.

Monitoring results at each stage of the treatment cascade is a clear macro-level imperative, enabling countries to understand how their programmes are faring, permitting donors to gauge the return on AIDS investments, and allowing the global community to assess how quickly progress in being made towards the 90–90–90 benchmarks. Both PEPFAR and the Global Fund have aligned their own HIV monitoring systems with the approach recommended by WHO, applying cascade analyses linked to outcomes of incidence and mortality to assess funding proposals and monitor results. Researchers based in the United Kingdom took the first step in documenting outcomes across the 90–90–90 cascade*(11)*, and IAPAC now provides easy online access to regularly updated cascade estimates for more than 50 countries.[§]

But these monitoring activities are proving to have their most important value at the programmatic level, as implementers now have a clear framework for analysing results in close to real time, permitting quick identification of bottlenecks and allowing timely programmatic adaptations to improve outcomes. This includes care programmes that use cascade analyses at the local level, such as in Brazil, Kenya, Viet Nam, Zimbabwe and other high-burden countries, and countries such as Indonesia, Thailand and Ukraine are using the monitoring framework to improve outreach, testing and programmes for key populations.

Leveraging 90–90–90 to close gaps in the AIDS response

The 90–90–90 agenda has also focused attention on longstanding gaps in the AIDS response and in broader health efforts. For example, the need for increased human resources for health to achieve 90–90–90 has renewed global resolve to address the severe and systemic health workforce crisis in low- and middle-income countries. According to WHO and the Global Health Workforce Alliance, 83 countries fall below the minimum density threshold of 22.8 skilled health professionals for every 10 000*(12)*.

In February 2016, UNAIDS joined with the Ministry of Health of the Federal Democratic Republic of Ethiopia and with the African Union Commission to host a global ministerial meeting on 90–90–90 and human resources for health. The meeting resulted in concrete pledges by health ministers to increase domestic investments towards a well-trained, strategically deployed community health workforce, as well as a plea to international donors to provide additional resources to build a robust and sustainable health workforce. In 2016, the

[§] http://hiv90–90–90watch.org.

World Health Assembly approved a new global strategy for human resources for health, prioritizing actions to strengthen community systems and to integrate community health workers into public health systems. Partnering with key stakeholders to build a sustainable health workforce is now an on-going, high-priority work stream for UNAIDS as part of the 90–90–90 agenda.

The 90–90–90 agenda has also given rise to a major global movement to address the treatment needs of children living with HIV (as explored in greater detail on pages 48-49). In April 2016, Caritas Internationalis convened global partners at the Vatican City to renew commitment to close the HIV testing and treatment gap for children. In May 2016, the First Lady of Côte d'Ivoire hosted a global ministerial meeting, in which 11 national ministers called for urgent action to fast-track the AIDS response for children by simultaneously scaling up HIV prevention, testing and treatment to end paediatric AIDS. Inclusion of a specific target for paediatric HIV treatment in the 2016 Political Declaration stems in large measure from the renewed attention to children's treatment needs resulting from the 90–90–90 movement.

Dr. Kesetebirhan Admasu, Minister of Health of the Federal Democratic Republic of Ethiopia, describes Ethiopia's pioneering experience with community health workers at a special side event on 90–90–90 and human resources for health at the 2016 High Level Meeting on Ending AIDS Ethiopia, February 2016

UNAIDS Executive Director Michel Sidibe joined with Dominique Ouattara, First Lady of Côte d'Ivoire, at a global ministerial meeting focused on paediatric HIV treatment in May 2016 in Abidjan

Proof on the ground: 90–90–90 can be achieved

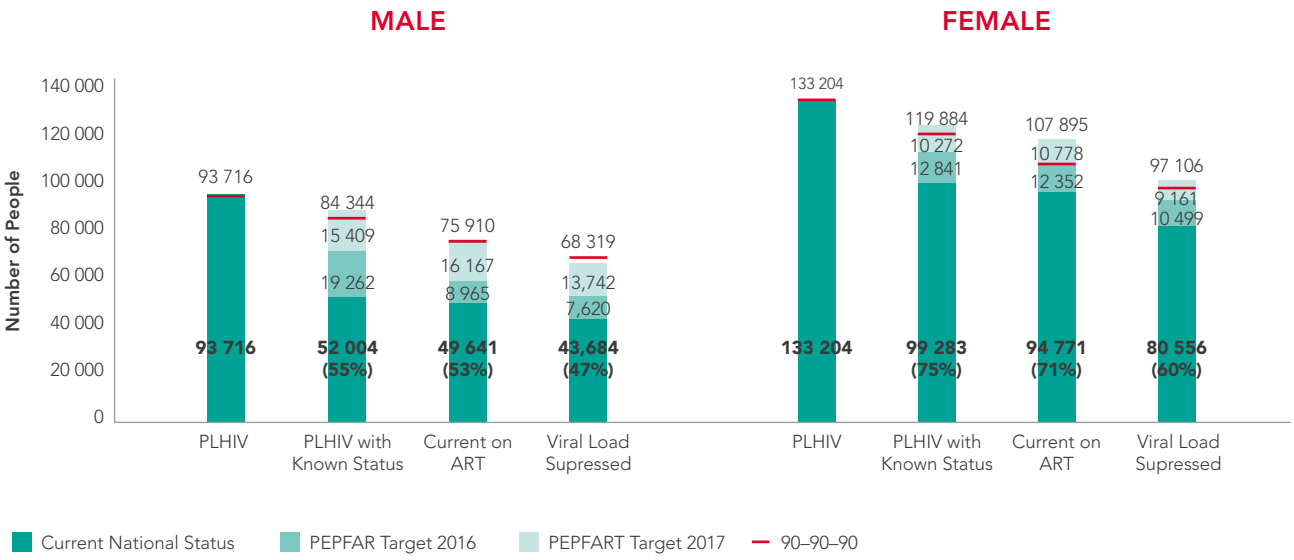
Not only are the benefits of the 90–90–90 approach clearer than ever, but it is also increasingly evident that the 90–90–90 target, while ambitious, is entirely achievable. In multiple regions, numerous countries appear to be well on their way towards achieving the 90–90–90 milestones in the near future, and scale-up trends indicate that many others are on track to do so by 2020. In many countries where progress in scaling up HIV treatment has lagged, rapid progress in being made in expanding access to HIV treatment, offering hope for even faster gains in 2016-2020.

In sub-Saharan Africa, home to more than 69% of all people living with HIV, many countries are already on track to reach 90–90–90. According to a population-based study, Botswana is set to achieve 90–90–90 by 2020, with 70.2% of people living with HIV from a large sample of people living in rural and periurban areas having already achieved viral suppression*(13)*. In Rwanda, 86% of people living with HIV knew their HIV status in 2013, 63% were receiving antiretroviral therapy, and 82% of HIV treatment patients were virally suppressed*(14)*. PEPFAR-supported programmes in Malawi also appear to be on track to reach 90–90–90, with 62% of people living with HIV in one rural district already virally suppressed*(15)*. In Swaziland, 60% of women living with HIV and 47% of men living with HIV who were enrolled in PEPFAR treatment programmes had achieved viral suppression in 2015 (Fig. 3), and the country, in partnership with PEPFAR, has plans in place to reach 90–90–90 by 2017. PEPFAR colleagues report comparable results in Kenya, Lesotho and other countries.

Bold targets to drive progress in the AIDS response

The 90–90–90 approach employs a strategy that has already had transformative effects in the AIDS response – setting bold targets, uniting diverse stakeholders around these targets, and using on-going, closer-to-real-time monitoring to ensure accountability for results. The global push to expand HIV treatment access began with the "3 by 5" initiative, and the use of bold targets was further reflected in the successful global effort to reach at least 15 million people with HIV treatment by 2015. Every time the world has set bold targets, sceptics have doubted their feasibility, but the AIDS response has repeatedly proved the sceptics wrong. The 90–90–90 agenda is premised on the same conviction that the world has the means, yet again, to achieve bold, ambitious targets in the face of doubts.

Figure 3
Swaziland Clinical Cascade – Sex Disaggregated



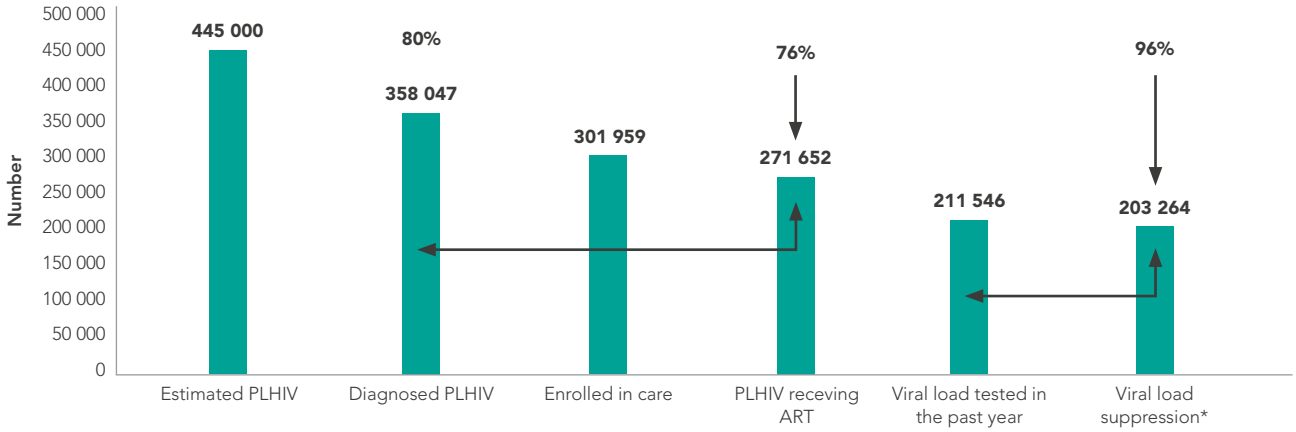
Sources: Global AIDS Response Progress Reporting (GARPR) 2016; UNAIDS 2016 estimates.

In Asia, countries have demonstrated the feasibility of achieving 90–90–90. Thailand is making important gains towards 90–90–90 by 2020 (Fig. 4), and 64% of all people living with HIV in Cambodia are virally suppressed, within reach of the 73% benchmark for viral suppression under the 90–90–90 target*(16)*. Other countries in the region have achieved impressive advances on one or more of the components of 90–90–90; in China, for example, 91% of people receiving antiretroviral therapy were virally suppressed in 2015.

The Latin America and Caribbean region has among the highest regional HIV treatment coverage in the world, with the percentage of people living with HIV receiving antiretroviral therapy increasing from 39% in 2012 to 55% in 2015. In Brazil, an estimated 83% of all people living with HIV knew their HIV status in 2014 and 80% of people with an HIV diagnosis were linked to HIV care and treatment*(17)*. In Chile, Ecuador and Guatemala, more than 80% of people receiving antiretroviral therapy were virally suppressed in 2015.

Figure 4

Thailand will reach the 90–90–90 targets ahead of the Fast Track targets in 2020



Sources: Global AIDS Response Progress Reporting (GARPR) 2016; UNAIDS 2016 estimates.

In 2015, several high-income countries – including Switzerland, United Kingdom, Australia, Netherlands, Denmark, and France – were nearing achievement of each stage of the 90–90–90 target*(11)*. In the British Columbia province of Canada, 83% of people living with HIV knew their HIV status as of December 2014, and 65% had achieved viral suppression. New evidence in 2016 indicates that Sweden has already achieved 90–90–90*(18)*.

In diverse countries, treatment coverage has dramatically increased in recent years, demonstrating how treatment services can rapidly be brought to scale in a relatively short period of time when sufficient resources and political commitment are in place. From 2012 to 2015, treatment coverage more than doubled in Mozambique (22 [18-27]% to 53 [43-66]%) and Uzbekistan (14 [10-21]% to 40 [30-58]%), and nearly doubled in the Bahamas (from 21 [20-24]% to 37 [34-41]%), Burundi (34 [28-40]% to 54 [43-65]%), Ecuador (34 [27-40]% to 54 [43-64]%), Gabon (32 [28-36]% to 58 [49-57]%), Papua New Guinea (32 [29-35]% to 53 [48-58]%), Uganda (33 [31-36]% to 57 [53-62]%), United Republic of Tanzania (31 [28-36]% to 53 [48-61]%) and several other countries. As these experiences demonstrate, sound national approaches can rapidly convert low or moderate coverage into much more robust coverage, underscoring the need for intensified efforts to achieve 90–90–90 even in settings where treatment coverage is currently disappointing.

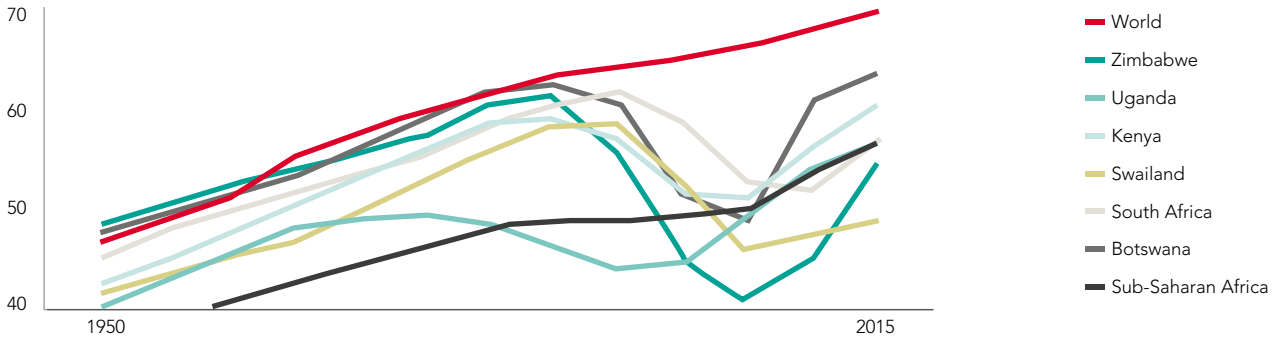
The scientific evidence is beyond question: Achieving 90–90–90 will have profound health and economic benefits

Perhaps the most important reason why the global community has rallied around the 90–90–90 agenda is the rapidly growing, compelling body of evidence documenting the extraordinary health and economic benefits that will accrue from achievement of the 90–90–90 target. The evidence is now crystal clear: The health and economic benefits of reaching 90–90–90 will reverberate across the Sustainable Development Goals, helping realize the vision of sustainable health and development for all.

In the last two years, vital health statistics have confirmed the extraordinary health benefits of antiretroviral therapy. As a result of scaled-up HIV treatment services, life expectancy in sub-Saharan Africa has sharply increased (Fig. 5) – by as much as a decade in some countries over the last 10 years – enabling the region to re-join the broader global trend towards increased longevity*(19)*.

Figure 5

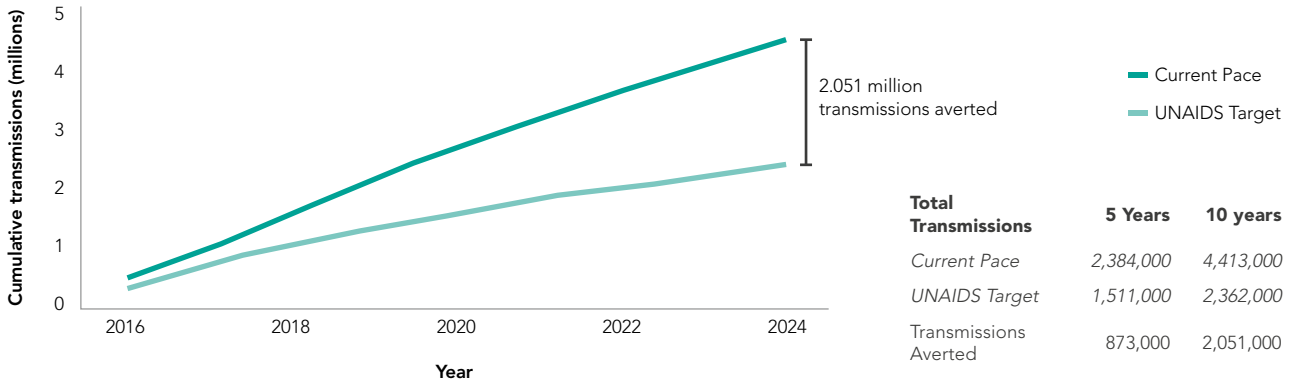
Dramatic impact of HIV response on life expectancy, 1950–2015



Source: United Nations Population Division, World Population Prospect, 2015 revision.

Figure 6

Projected cumulative HIV infections, South Africa, 2016-2026: 90–90–90 vs. current scale-up pace

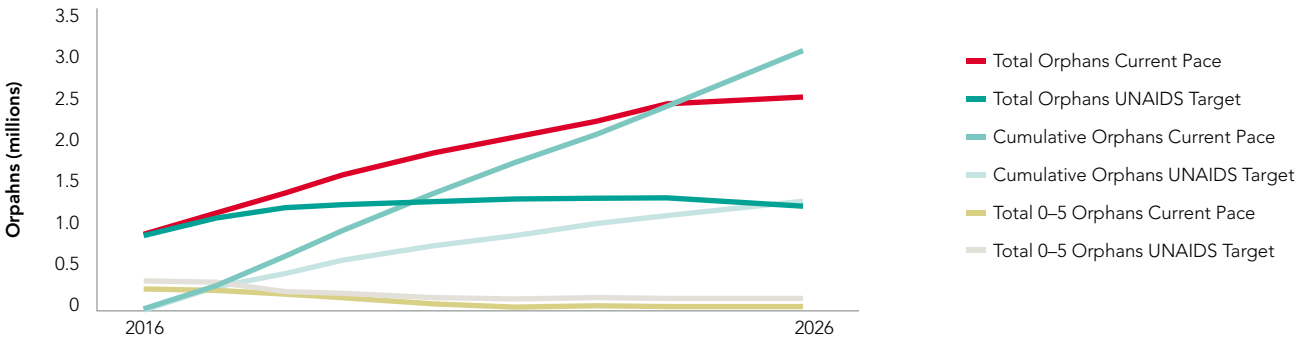


Total Transmissions	5 Years	10 years
Current Pace	*2,384,000*	*4,413,000*
UNAIDS Target	*1,511,000*	*2,362,000*
Transmissions Averted	873,000	2,051,000

Source: Walensky, et al., Annals of Internal Medicine, 2016, Used with permission. © 2016 American College of Physicians.

Figure 7

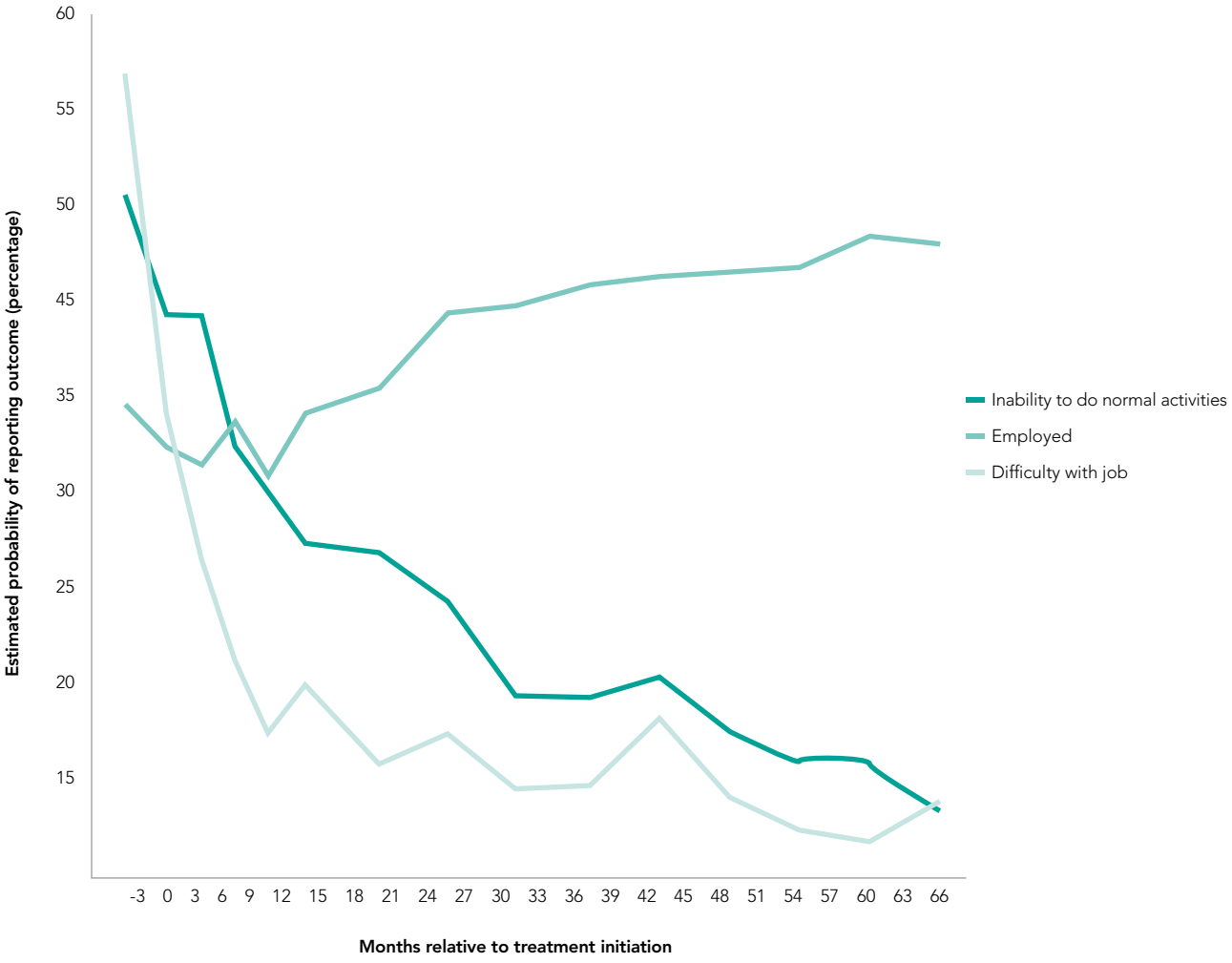
Projected number of children orphaned by AIDS, South Africa, 2016-2026: 90–90–90 vs. current scale-up pace.



Source: Walensky, et al., Annals of Internal Medicine, 2016, Used with permission. © 2016 American College of Physicians.

Figure 8

Treatment improves economic opportunity for people living with HIV



Source: Rosen et al., AIDS 2014

In 2016, researchers assessed the effects that achievement of 90–90–90 by 2020 would have in South Africa, the country with the world's largest HIV epidemic. Compared to a continuation of the current pace of scale-up in 2016-2020, researchers found that reaching 90–90–90 in South Africa would over a decade prevent more than 2 million new HIV infections, avert more than 2.5 million deaths and save more than 13 million life-years (Fig. 6)*(20)*. These modelling projections are in line with findings from the real world; in a population-based cohort in KwaZulu-Natal, South Africa, initiation of antiretroviral therapy was found to be associated with a 77% reduction in HIV incidence from 2005 to 2013*(21)*. Compared to the current pace of scale-up, achieving 90–90–90 would over a decade prevent more than 1.7 million children in South Africa from being orphaned as a result of AIDS (Fig. 7).

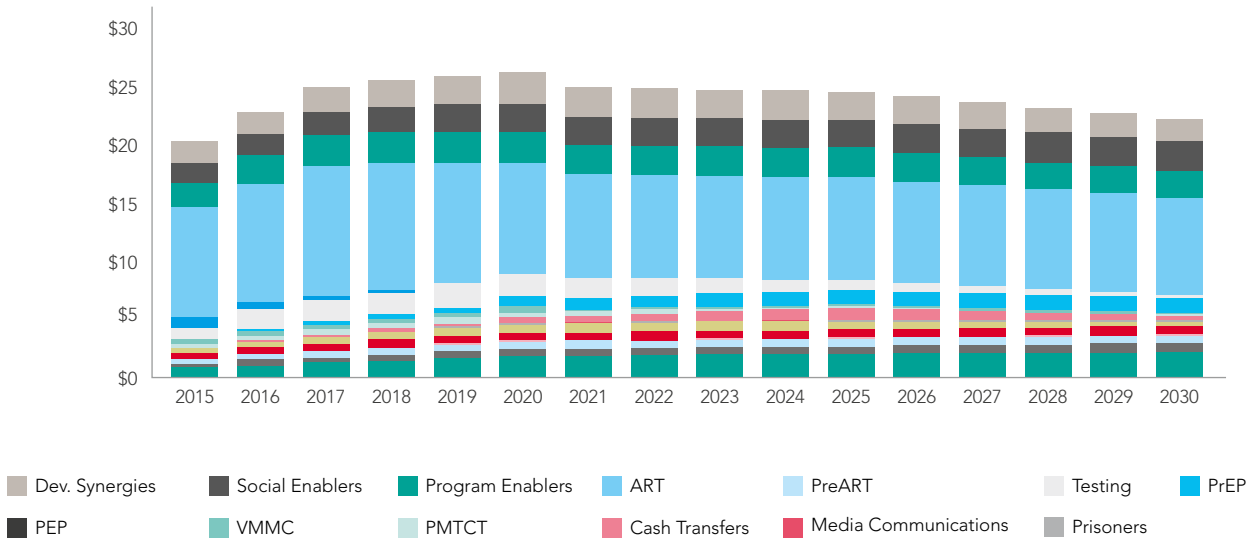
Since the launch of the 90–90–90 target, additional, definitive evidence has emerged regarding the clinical benefits of very early initiation of antiretroviral therapy, confirming the need for a treat-all approach to HIV. One trial – TEMPRANO – found that early initiation of antiretroviral therapy, combined with six months of isoniazid preventive therapy, led to a 44% drop in severe HIV-related illness and a 35% decline in the risk of death*(22)*. Also in 2015, the START trial likewise found that early antiretroviral therapy reduced by more than half serious HIV-related and non-HIV-related health problems as well as the risk of death*(23)* Additional evidence emerged in 2016, when further analyses of the START trial results reported that immediate initiation of antiretroviral therapy markedly reduced the risk of HIV-related cancers*(24)* and bacterial infections*(25)*.

The human benefits of achieving 90–90–90 are enormous. Receiving antiretroviral therapy leads to remarkable improvements in quality of life for people living with HIV and substantially improves their economic prospects*(26)(27)*. The proportion of people living with HIV reporting pain fell from 69% to 17% after five years on antiretroviral therapy, while individuals receiving HIV treatment were nearly nine times less likely to report being fatigued than in the three months prior to starting therapy. Starting antiretroviral therapy markedly increases the likelihood of employment for people living with HIV and significantly reduces reported difficulties in performing a job (Fig. 8).

The road to financing 90–90–90 is clear, but renewed commitment will be needed

When 90–90–90 was launched two years ago, questions immediately arose as to how much achievement of the targets would cost, along with doubts that the world had the financial means to reach the target. Today, however, the financial resources required to reach the 90–90–90 target are clear, and it is equally clear that while new resources will be needed, the increases required are fully within the means of the international community.

Figure 9
Resource Needs by Intervention (Billions of US$)



Source: J. Stover, 2016.

Investments needed to achieve the 90–90–90 target will peak in 2017, at US$ 19.3 billion, declining thereafter to US$ 18 billion in 2020 (Fig. 9)*(28)*. Putting the world on track to reach the 90–90–90 target will demand that treatment services represent 80% of AIDS spending in 2017, but the relative treatment component of AIDS support will then begin to decline (to 72% in 2020) and continue falling over time if investments are front-loaded*(28)*.

Total resources needed to reach the Fast-Track targets (of which 90–90–90 is a part) amount to US$ 26.2 billion in 2020 – a roughly one-third increase over amounts available in 2014*(28)*. To close this resource gap, the world must adhere to the principles of global solidarity and shared responsibility that have made possible the many gains already achieved in the AIDS response.

Countries themselves must invest more in HIV testing and treatment programmes, taking steps to translate economic growth into new resources for health and development. According to UNAIDS Prevention Gap Report, publised in 2016, domestic sources accounted for 57% of all HIV-related financing available in 2015, with several countries taking steps to increase budget allocations for HIV. In South Africa, domestic spending on HIV rose five-fold from 2003/2004 to 2009/2010*(29)* and increased an additional 27% from 2011 to 2013*(5)*. From 2009 to 2014, domestic spending on AIDS rose by more than 50% in 46 countries, with AIDS spending more than doubling in 35 countries*(29)*.

When increasing domestic investments in the AIDS response, many countries are prioritizing HIV treatment services. From 2009 to 2014, domestic public spending on antiretroviral therapy more than doubled in Chad, Côte d'Ivoire, Gabon, Kenya, Namibia and Swaziland. Based on expenditure figures reported to UNAIDS, other countries that have notably increased domestic spending for HIV treatment include Algeria, Bangladesh, Colombia, Malaysia, Mozambique, Myanmar, South Africa and Tajikistan. As South Africa scaled up its domestic financing for AIDS, the proportion of total AIDS spending devoted to antiretroviral therapy increased from 2011 to 2013*(5)*.

International support for the AIDS response will also need to grow over the next five years to drive progress towards 90–90–90. In 2015 donor disbursements for HIV has reduced by 0.6 billion. The decrease was partly driven by delayed disbursement from the U.S, the largest bilateral donor. In particular, replenishing the Global Fund in 2016 is a critical priority.

Immediate front-loading of resources is required to maximize the reduction in new HIV infections and minimize long-term costs associated with HIV treatment programmes*(31)*. The previously described study projecting the health and economic benefits of 90–90–90 in South Africa found that a five-year delay in reaching 90–90–90 (from 2020 to 2025) would reduce the clinical benefits of antiretroviral therapy by 25-33%, diminishing the health and economic savings of HIV treatment and substantially increasing long-term costs associated with the AIDS response.

The efficiency of treatment programmes is improving

Although the incremental increase in resources required to reach 90–90–90 is manageable with sufficient political will, additional strategies exist to improve efficiency and limit the resources that will be needed.

Costing exercises have found that actual per-patient costs for HIV treatment programmes are notably lower than originally understood*(32)*. As treatment programmes are brought to scale, incremental costs associated with adding new patients decline, as fixed programmatic costs are spread over a larger patient population. Even as PEPFAR funding has remained relatively flat for the last five years, the number of people the programme has supported with antiretroviral therapy has sharply increased. A similar pattern can be seen globally, as the pace of treatment scale-up has markedly outstripped the much more modest rise in resources available for the AIDS response. The treat-all approach itself promotes efficiency by altering the mix of patients, increasing the proportion of early-stage patients, whose care is much less costly to health systems than patients with advanced HIV disease.

Innovative service models are simultaneously enhancing the efficiency of treatment programmes and improving programmatic impact. For example, even as facility staffing levels in Malawi remained stable from 2010 to 2014, the HIV patient load nearly doubled, as task-shifting and other approaches helped decrease non-medicine-related costs of service delivery by 40%. In Zambia, the move to greater use of community service delivery is helping lower the costs of treatment programmes, with community delivery associated with a 32% decline

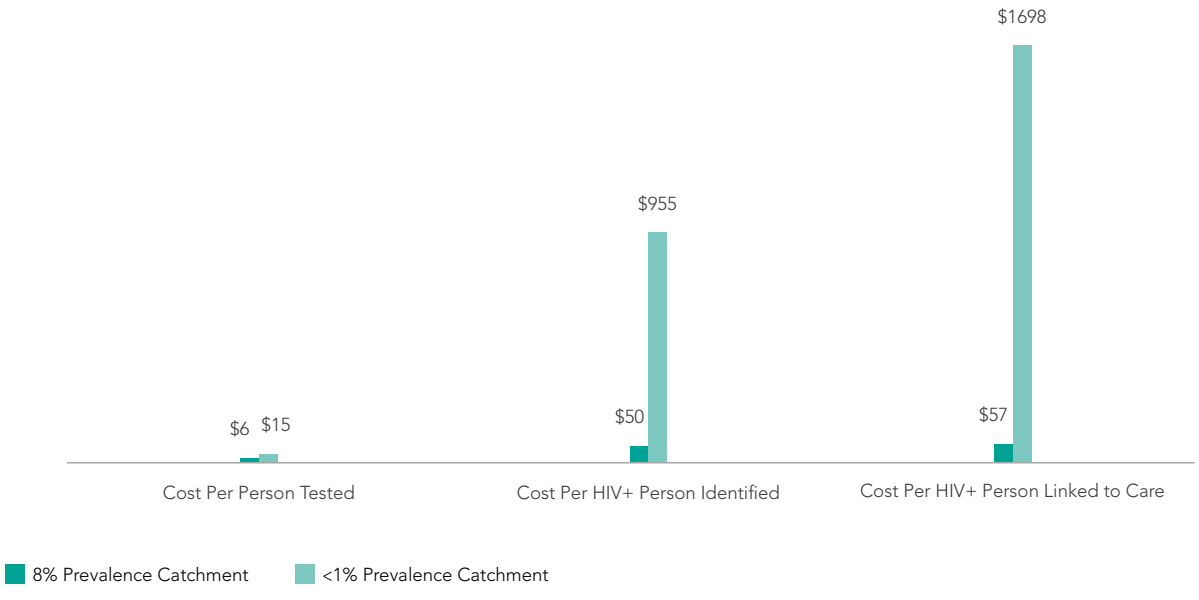
in per-patient treatment costs compared to facility-based services.

Improving the targeting of services also increases the efficiency of national responses and the return on HIV investments. Analyses by CHAI, for example, indicate that home-based testing programmes are more cost-effective when they are implemented in high-prevalence areas (Fig. 10).

Price negotiations have also helped to enhance the efficiency of HIV testing and treatment programmes. Under the umbrella of the Diagnostics Access Initiative, and with strong support from the Government of South Africa, partners have negotiated substantial reductions (of at least 40%) in prices for technologies for viral load testing and early infant diagnosis. CHAI estimates that the viral load price reduction, finalized in late 2014, has already led to US$ 9 million in savings to national treatment programmes and accelerated uptake of viral load monitoring in sub-Saharan Africa.

Figure 10

The cost of home-based testing in different geographies



Source: Clinton Health Access Initiative, 2016.

The 90–90–90 agenda is catalysing and benefiting from innovation

Innovation has been a hallmark of the AIDS response. AIDS has galvanized innovation in technology (including the development of successively more effective antiretroviral medicines), service delivery (such as Option B+, or initiation of lifelong antiretroviral therapy among pregnant women living with HIV), policy (including innovative use of flexibilities in international intellectual property rules to drive down the price of first-line antiretroviral therapy by 99% over the last 15 years) and advocacy (including the transformative mobilization of people living with HIV and the communities most affected by HIV).

Over the last two years, continued innovation has helped drive progress at each stage of the 90–90–90 cascade, and the urgency of the 90–90–90 target itself has catalysed rapid uptake of proven innovations. Key innovations include strategic new technologies, as well as novel strategies that improve the reach of HIV services and reduce service costs.

Innovation towards the first 90

While lack of timely diagnosis has long represented the single greatest impediment to the realization of global HIV treatment goals, innovation in technology and service delivery now offers the opportunity to achieve rapid progress towards the goal of 90% knowledge of HIV status among people living with HIV.

Technological innovations for HIV testing
Since the first HIV antibody test was approved for use in 1985, testing approaches for HIV have become progressively more accurate and simpler to use. These innovations have in turn spurred considerable innovation in service delivery approaches, including various mobile and home-based testing approaches*(33)*.

More recently, numerous self-testing technologies have emerged*(34) (35)*, with three products having received regulatory approval in the USA or Europe. WHO advises that self-testing offers great potential to accelerate uptake of testing services*(7)*, and new guidelines on the use of self-testing technologies are anticipated within the next several months. Already, Brazil, France, the United Kingdom and the USA have approved HIV self-testing, and countries that have either included self-testing in their national strategies or are in the process of doing so include Botswana, China, Kenya, Malawi, Namibia, Peru, Rwanda, South Africa, Thailand, Zambia and Zimbabwe. In particular, self-testing may increase testing opportunities in populations that are sometimes difficult to reach through mainstream testing programmes; one recent study found that roll-out of self-testing was both acceptable and feasible among residents of an informal settlement in South Africa*(36)*.

Likewise, the development of numerous point-of-care platforms for early infant diagnosis has the potential to substantially increase the number of infants who initiate antiretroviral therapy in a timely manner*(37)*. In 2016, WHO prequalified two point-of-care products for early infant diagnosis – the Alere™ q HIV 1/2 Detect and the Xpert® HIV-1 Qual Assay. By facilitating swifter diagnosis of HIV among HIV-exposed infants, point-of-care platforms can increase the share of infants living with HIV who initiate antiretroviral therapy before the occurrence of peak mortality in the early months of life.

Technology is also being mobilized to improve the effectiveness of existing platforms for early infant diagnosis, which rely on centralized laboratories and the transport of dried blood spots. Unmanned aerial systems (or drones), which offer a potential strategy for the routine transport of laboratory specimens*(38)*, are being piloted by Malawi, with the support of UNICEF, to reduce delays associated with early infant diagnostic testing. Programmes are also using mobile text messaging to reduce delays in the delivery of test results for HIV-exposed children.

Innovation in the delivery of HIV testing services
Innovation in service delivery is helping to increase the proportion of people living with HIV who know their HIV status. Community-centred, home-based testing efforts have proven highly effective in reaching people living with HIV who would otherwise not be diagnosed through mainstream, facility-based efforts*(39)*. In the PopART trial in Zambia, a home-based testing approach increased knowledge of HIV status from 50% to 90% among

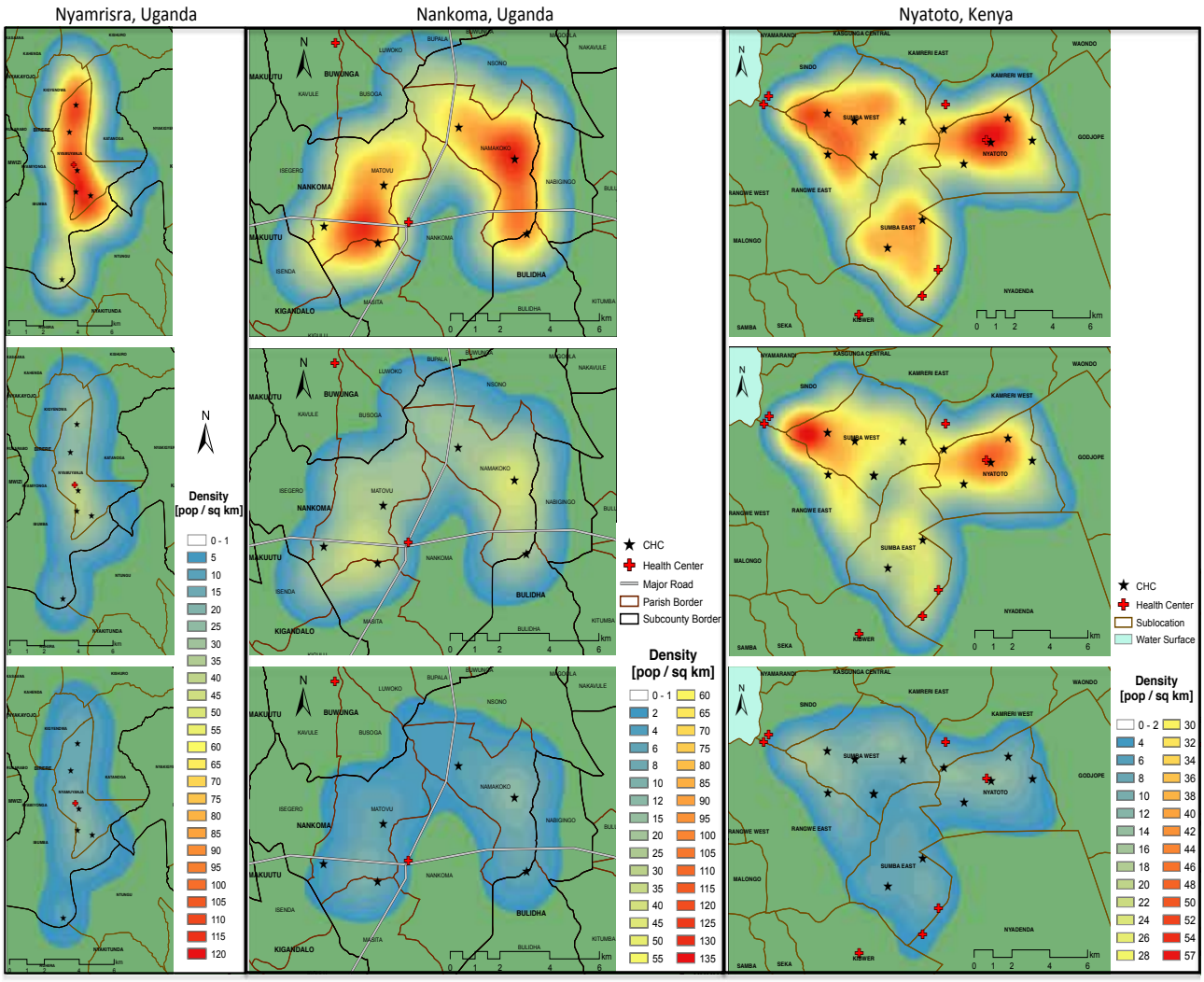
the more than 101 000 adults who were contacted and consented to participate*(40)*.

The SEARCH project, implemented in 32 rural communities in Uganda and Kenya, situates HIV testing and treatment within a broader health programme that addresses multiple diseases, such as diabetes, hypertension, malaria, tuberculosis, cervical cancer, male circumcision and child services (e.g., de-worming, Vitamin A). As part of SEARCH's hybrid mobile and home-based testing effort, two-week multi-disease health fairs are held in close proximity to where people live, peer educators build demand for services and provide health-related counselling, and streamlined systems enable providers to reach large numbers of community members in a short time. After two years, the programme achieved 94% knowledge of HIV status among residents of the 32 communities*(41)* Fig. 11 illustrates how lack of awareness of HIV status virtually disappeared over two years in the rural communities reached by SEARCH. Costs of this hybrid approach are in the range of other testing approaches*(41)*.

Community-based, multi-disease health promotion events have enabled the SEARCH project to reach the 90–90–90 targets in 32 rural communities in Uganda and Kenya.

Figure 11

Unknown HIV status (in red and yellow) over 2 years in rural communities in Uganda and Kenya



Source: D. Havlir et al., 2016.

Mobilizing lay community workers to aid in the delivery of HIV testing services offers an efficient and effective way to increase testing uptake*(43) (44)*. While community-based testing services accounted in 2015 for only 0.7% of all tests administered in China, they identified 30% of new HIV diagnoses*(45)*. According to surveys, most countries permit community workers to administer HIV testing, but a number of countries prohibit lay providers from performing an HIV test. Countries that do not permit lay testing should take immediate steps to reform their policies to permit this proven approach.

In San Francisco, health authorities have collaborated with communities to implement a multi-dimensional effort to rapidly scale up HIV testing. Testing is provided through multiple channels – including community centres in affected communities, clinics and hospitals, and mobile vans that serve the homeless and patrons of gay bars – and opt-out testing for HIV is offered at substance abuse treatment centres. By prioritizing HIV testing, San Francisco has achieved 95% knowledge of HIV status among people living with HIV.

To help reduce delays in the initiation of paediatric HIV treatment, South Africa in 2015 introduced virologic testing at birth for all HIV-exposed infants. In the first three months following the launch of this innovative approach, the number of HIV-exposed infants receiving virologic testing within seven days of birth rose by more than 15-fold, with the number of HIV-diagnosed children rising more than six-fold*(46)*.

Innovation towards the second 90

Innovation also continues to drive gains towards the goal of ensuring that 90% of all people with diagnosed HIV infection receive sustained antiretroviral therapy.

Technological innovation in HIV treatment

Over the last two years, new antiretroviral compounds have been validated as potentially superior to those currently in use. Particular optimism has greeted the emergence of dolutegravir and tenofovir alefenamide (TAF), which not only have the potential to improve treatment outcomes but also to reduce the costs of treatment regimens*(47)*.

The continued expansion of antiretroviral therapy options over the last two years underscores the imperative of continued investments in HIV research. Multiple fronts in HIV research need to be pursued, including further optimizing existing HIV treatment options and advancing towards the ultimate goal of a cure for HIV infection.

Particular energy in HIV research is focusing on the development of long-acting, injectable antiretroviral formulations, which have the potential to reduce adherence challenges associated with HIV treatment. Further efforts are especially needed to increase the array of child-friendly antiretroviral regimens suitable for very young children*(47)*.

Innovation in HIV treatment service delivery

Community distribution of antiretroviral medicines has proven highly effective in expanding the reach and improving the outcomes of HIV treatment

programmes. For example, The AIDS Support Organization (TASO) in Uganda delivers medicines to local villages or towns, reducing burdens on patients associated with medication refills and increasing rates of retention in care*(39)*. Inspired by the success of TASO's community-centred model for HIV treatment delivery, the Ministry of Uganda is now working on guidelines to streamline the TASO-generated approach into the broader health system. Similar results have been reported for Community ART Groups in Malawi, which reduced the number of antiretroviral refill visits to health facilities by 59%, without a single reported episode of the theft or loss of medicines*(48)*.

Changes in clinical practice are also helping accelerate HIV treatment uptake and increase retention in care. Streamlining clinic procedures for refills of antiretroviral therapy has been shown to contribute to retention in care, with one clinic in Malawi achieving 97% retention in care after deploying community health workers to conduct quarterly adherence assessments using a standardized assessment tool*(49)*. In Uganda, a multi-component intervention to influence the knowledge and behaviours of health care workers resulted in a doubling of the probability of HIV treatment initiation within 14 days of eligibility*(50)*.

Maximizing the reach and sustainability of HIV treatment efforts demands innovative health workforce approaches to empower community health workers to deliver essential HIV treatment services. In reality, task shifting strategies that look to community health workers to assume a variety of clinical tasks are not especially new, as it has long been known that community health workers can deliver a high quality of treatment services, improve treatment access for hard-to-reach patients and enhance the efficiency of treatment efforts*(51)*. However, these validated approaches have not been widely adopted, although countries such as Ethiopia and Malawi have successfully leveraged community health workers to expand the reach and impact of HIV and other health services.

Further efforts are needed to translate proven task-shifting approaches into standard practice in HIV testing and treatment programmes. For example, policy and professional barriers to task shifting in clinical settings must give way to approaches that actively encourage the transition of clinical tasks to community health providers. Resources must be mobilized to train, support and remunerate community workers*(52)*, and the status of community health workers must be elevated to ensure their full integration into health systems. UNAIDS advises that the proportion of HIV services delivered through community-based channels will need to rise from 5% currently to 30% to fast-track the response, necessitating major increases in funding for community service delivery*(1)*. With donors currently supporting many of the initiatives to train and deploy community health workers in the AIDS response, countries will need to allocate new domestic resources towards community systems as donors over time begin to withdraw assistance in the transition to greater country ownership*(53)*.

Further service delivery innovation will be needed to achieve and sustain the 90–90–90

target. Possible service approaches currently under consideration include issuance of health passports that enable clients to pick up pills at any pharmacy. In fragile settings, Médicins Sans Frontières has successfully experimented with multi-month "runaway packs" of medicines, enabling individuals who might need to flee conflict or other humanitarian disasters to do so without losing access to their HIV medicines*(54)*.

Innovation towards the third 90
New technologies and service approaches are also helping increase the proportion of people receiving antiretroviral therapy who achieve viral suppression.

Technological innovation to maximize viral suppression
Access to viral load testing is not only the right of every person living with HIV, but regular viral load testing also aids in achieving viral suppression by alerting providers to early signs of adherence problems. However, CHAI projects that scale-up of viral load testing is happening too slowly, with substantial unmet need for viral load testing projected in every year in 2016-2020 (Fig. 12). National viral load strategies are urgently needed to bring these essential viral load diagnostic technologies to scale.

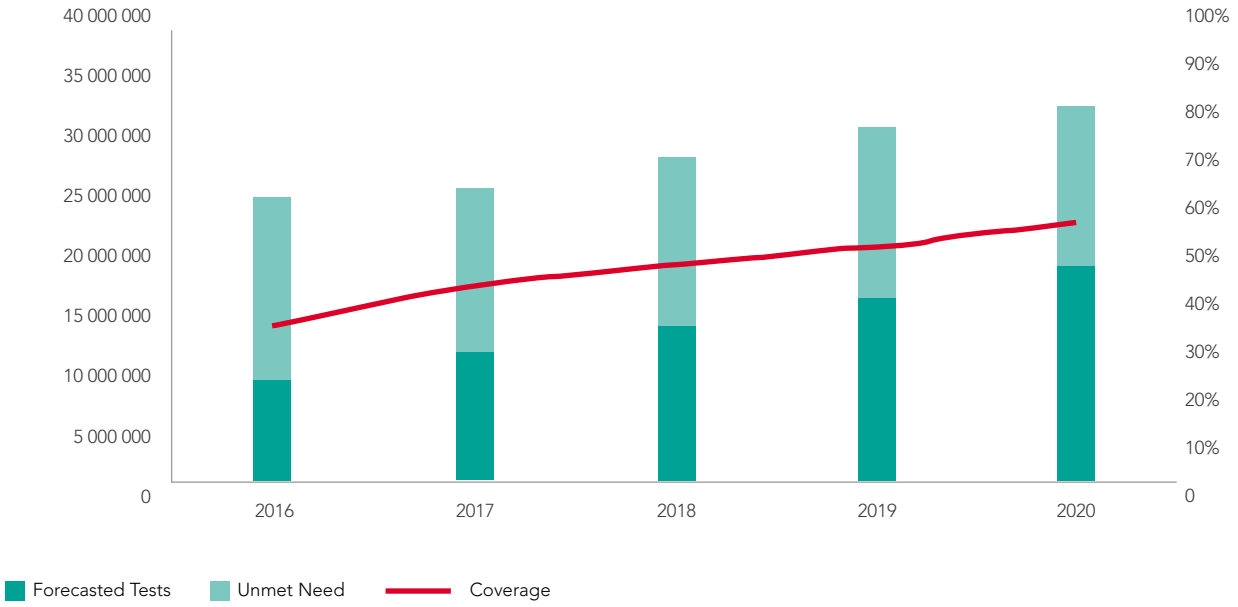
Innovative approaches are helping to increase utilization of existing viral load technologies and generating new technologies to monitor viral load. Due in large measure to negotiated price reductions for viral load testing platforms, CHAI reports that volumes in viral load procurement since the finalization of price reductions in late 2014 have exceeded forecasted demand in sub-Saharan Africa by 11%, equalling an additional 5 million viral load tests in less than two years.

In addition, the emergence of a robust pipeline of point-of-care viral load testing platforms offers the prospect of simpler, more cost-effective and patient-friendly approaches to viral load testing*(55)*. With point-of-care testing, delays in the return of test results can be averted, enabling clinicians to identify and address adherence challenges and treatment failure even sooner.

Particular enthusiasm has focused on the GeneXpert assay, a platform in wide use for the detection of tuberculosis and drug resistance to rifampin. Kenya is preparing to roll out use of GenXpert instruments for HIV viral load and early infant diagnosis, and Malawi and Zimbabwe are reportedly planning to pilot use of GeneXpert for HIV viral load testing in the near future. Recent evaluations have found that the GeneXpert HIV viral load platform yields results comparable to standard viral load assays performed by centralized laboratories*(56)*.

Innovative service delivery strategies to maximize viral suppression
Service delivery innovations are also helping increase rates of viral suppression. In San Francisco, adaptation of service approaches to prioritize very rapid initiation of antiretroviral

Figure 12
Projected global scale-up of viral load testing, 2016–2020



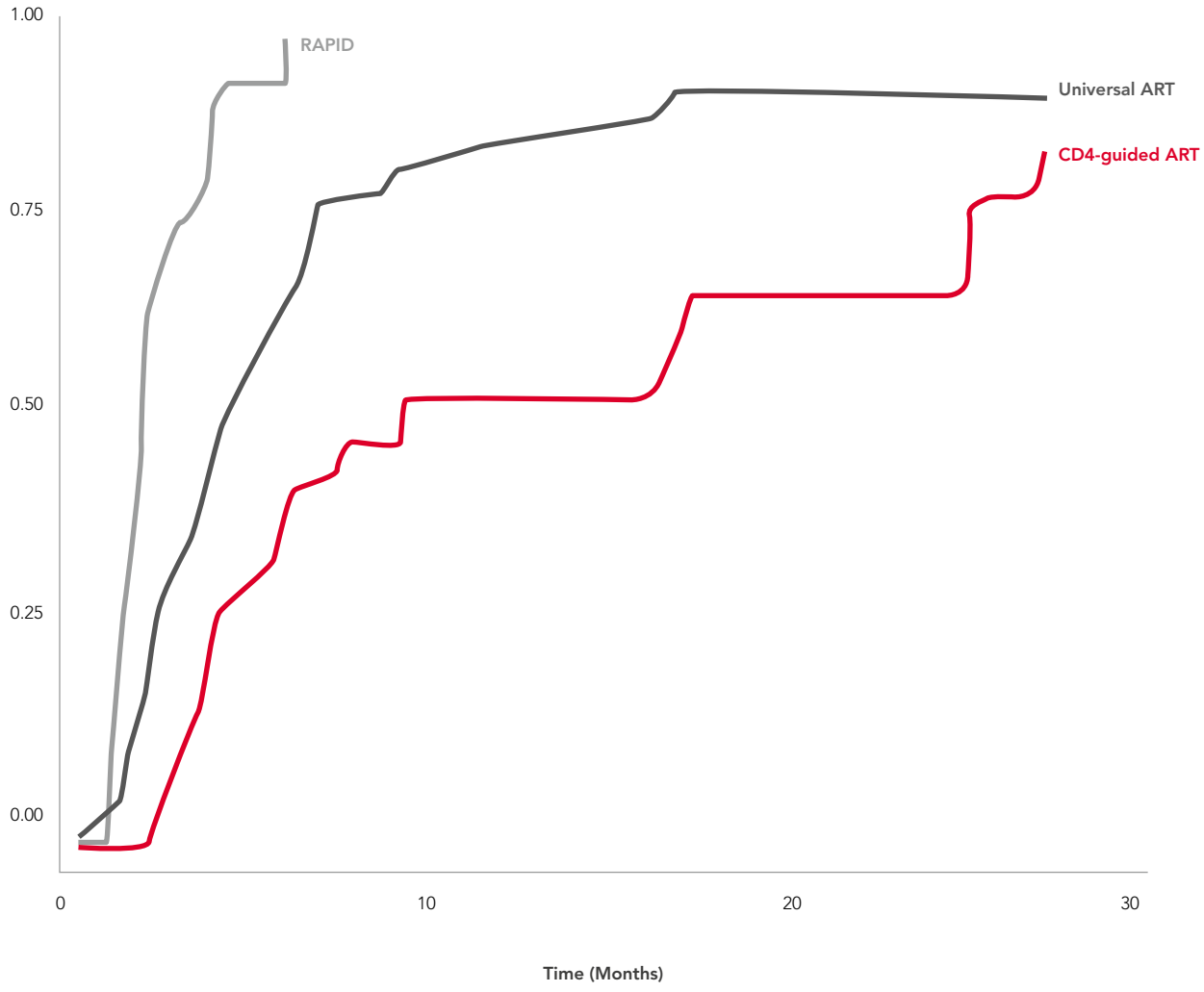
Source: Clinton Health Access Initiative, 2016.

Note: Need is estimated using projected ART patient numbers and testing guidelines. Testing guidelines are assumed to be equal to the one test per patient per year recommended by WHO except where country recommendations require additional tests for all patients.

therapy for people who test HIV-positive has sharply reduced the time between diagnosis and viral suppression (Fig. 13).

Other service adaptations have the potential to increase rates of viral suppression. With most cases of treatment failure occurring within the first year after initiating therapy, a recent study found that measuring viral load at three months after treatment initiation, combined with an adherence intervention, reduced the risk of virologic failure by 22% compared to patients whose viral load was monitored six months after starting therapy*(57)*.

Figure 13
Months from diagnosis to viral suppression in San Francisco with differing clinical approaches



Source: Pilcher, IAS Vancouver, 2015.

Retaining individuals in HIV care and helping them adhere to treatment are vital to achieving high rates of viral suppression. Peer-driven adherence clubs have proven effective in increasing treatment adherence among antiretroviral therapy patients, including individuals who had previously struggled to achieve viral suppression*(58)*. Not only are adherence clubs associated with superior rates of retention in care*(49)* – in Khayelitsha, South Africa, 98% of adherence club patients remained engaged in care after one year – but this approach may be as or more more cost-effective than facility-based services*(59)*. The adherence club model is now being scaled up in South Africa and other high-burden countries, with the metropolitan area of Cape Town serving as home to hundreds of adherence clubs.

In Mozambique, self-formed Community ART Groups are associated with high rates of linkage to care and superior coverage for viral load testing*(60)*. While 77% of individuals receiving HIV care in health facilities in Mozambique are retained in care at 36 months, retention among those served by Community ART Groups in the country is 95%*(49)*.

The foundation to sustain HIV treatment programmes is being laid

Even after the 90–90–90 target is achieved, countries will need to ensure access to lifelong antiretroviral therapy for decades. Over the last two years, key steps have been taken to ensure the long-term financial sustainability of HIV treatment efforts.

The prices of antiretroviral regimens in low- and middle-income countries have continued to fall, although at a slower pace than in prior years (Fig. 14)*(61)*. Newer antiretroviral medicines – such as dolutegravir and TAF – have the potential to lower even further the costs of antiretroviral regimens. A recent analysis by CHAI concluded that incorporating these newer antiretroviral compounds could save US$3 billion in HIV treatment costs globally through 2025*(62)*.

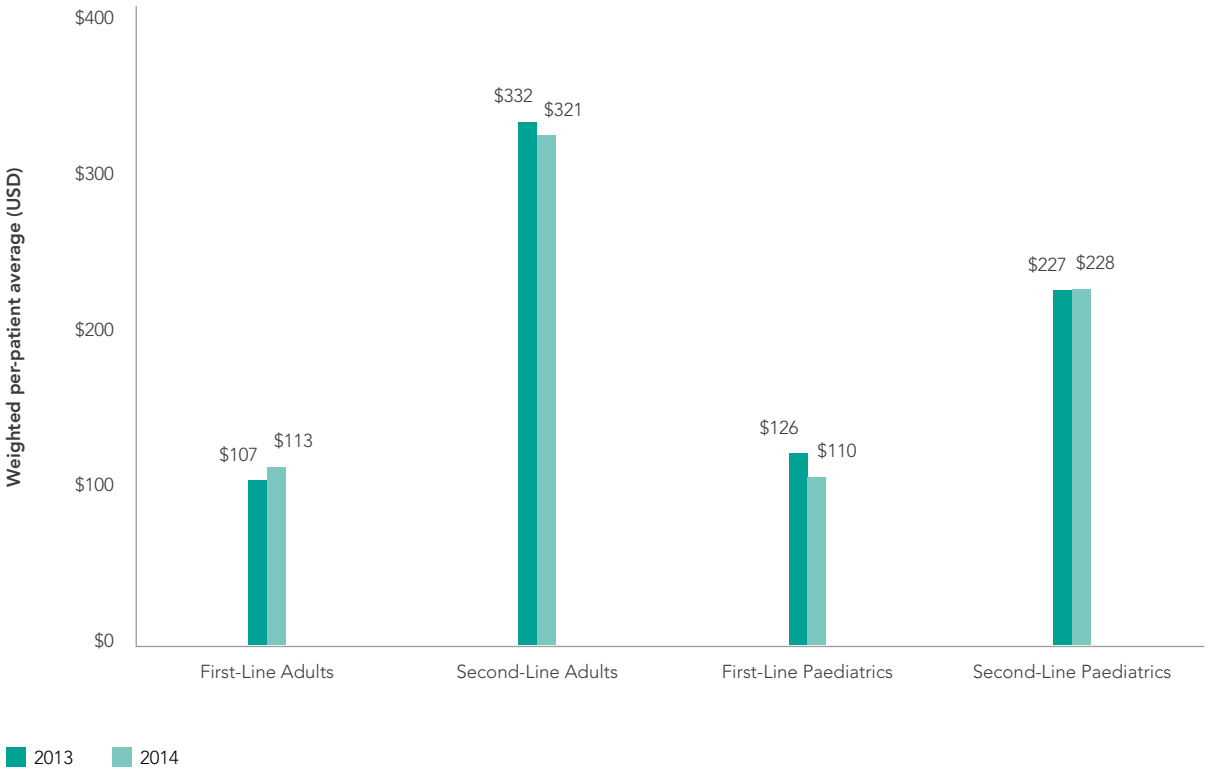
There is evidence that the generic market for antiretroviral medicines is becoming increasingly concentrated, with four Indian manufacturers accounting for 70% of generic antiretroviral medicines purchased for use in low- and middle-income countries in 2014*(61)*. Maintaining competition in the generic market and preserving India as a viable supplier of generic medicines in the short term will be critical to hopes for reaching 90–90–90. In the longer term, increasing local pharmaceutical manufacturing capacity in Africa, as envisaged in the African Union's Pharmaceutical Manufacturing Plan for Africa, is likely to be needed to ensure the sustainability of HIV treatment programmes*(63)*.

Second-line regimens remain more costly than first-line regimens, highlighting the need for proactive efforts to reduce the costs of the second-

line medicines that will become increasingly important over time. The success of the Medicines Patent Pool in securing licenses for newer antiretroviral medicines, such as the recommended second-line paediatric compound raltegravir, is cause for hope that affordable generic alternatives will be available as more patients switch to second-line regimens in the coming years*(64)*. The Medicines Patent Pool estimates that its patent agreements for 12 antiretroviral medicines and one hepatitis C medicine saved the international community US$ 195 million in 2012-2015.

Figure 14

Weighted average market price (USD) for antiretroviral regimens in generic-accessible countries[6]



Source: Clinton Health Access Initiative, 2015.

90–90–90 offers a pathway towards sustainable health for all

The historic scale-up of HIV treatment has not only transformed the AIDS response, but it has also generated broad-based benefits for health systems generally. HIV funding has supported the training of tens of thousands of health workers, built and refurbished clinics, and strengthened national systems for strategic public health information and for commodity procurement and supply management. As programmes are further scaled up to achieve 90–90–90, even greater gains will support the development of strong, flexible, universally accessible, people-centred health systems, as envisaged in the Agenda for Sustainable Development.

The many ways that HIV treatment programmes are benefiting health systems and contributing to sustainable health are varied and broad-ranging. In Haiti, for example, the emphasis of HIV programmes on quality improvement appears to be spreading to the management of other health problems, such as tuberculosis, maternal health and inpatient services*(65)*. The success of HIV programmes in ensuring continuity of care in the midst of protracted emergencies offers insights regarding how best to address other health priorities, such as non-communicable diseases, in fragile settings*(66)*. Experience with HIV treatment also offers valuable lessons applicable to management of chronic, non-communicable diseases*(67)*, and HIV treatment services offer a potentially important platform for the integration of services for non-communicable diseases*(68) (69)*.

As the AIDS response now works to travel the final mile to end the AIDS epidemic, opportunities for linking the 90–90–90 agenda to the broader

goal of sustainable health for all are apparent. Hopes for achieving 90–90–90 depend on robust and durable health systems, while the push to reach 90–90–90 may represent the best chance to strengthen health systems in the next several years.

This is particularly apparent with regard to the health workforce. The 90–90–90 target requires a near-doubling in the number of people receiving antiretroviral therapy in just five years. Through investments by PEPFAR and other partners, medical educational efforts will help close this gap, in particular with the deployment of newly trained nurses. For example, PEPFAR's Nursing Education Partnership Initiative, established in 2011, supports 19 nursing and midwifery education institutions in sub-Saharan Africa*(70).* Although prompted by the urgency of increasing the health workforce to support delivery of HIV testing, treatment and prevention services, these new cadres of trained nurses will generate broad-based health benefits for the region in future years.

In light of the urgency of scaling up HIV treatment services and the acute shortages that persist in many countries*(71)*, additional efforts will be needed to address health workforce deficits. To help mobilize the health workforce that will be needed to reach and sustain 90–90–90, UNAIDS in 2016 forged a new strategic partnership with the 1 Million Community Health Workers initiative, with the aim of addressing the health workforce crisis by training, strategically deploying and supporting new cadres of community health workers to accelerate and sustain efforts to reach the 90–90–90 target. While community service delivery is often more cost-effective than facility-based services, building a sustainable community workforce cannot be done on the cheap. To ensure sustainability, community health workers need to be fairly compensated, appropriately supervised and supported, and provided opportunities for continuing education and career advancement. The role of community health workers must be formalized and integrated within the broader health system*(72).*

Towards 90–90–90: Moving forward to overcome barriers and accelerate progress

Substantial gains have been made towards each of the 90–90–90 steps, with particularly notable progress in the last two years. However, major improvements will be needed to meet the target by 2020. In particular, to achieve 90–90–90, the AIDS response must effectively address barriers in four different domains – (1) removing roadblocks at each stage of the 90–90–90 continuum, (2) accelerating scale-up in settings where HIV treatment has lagged, (3) overcoming barriers to care experienced by groups that are being left behind, and (4) removing social and structural barriers to scale-up.

Improving results at each stage of the 90–90–90 continuum

To meet the 90–90–90 target, results at each stage of the HIV continuum of care will need to improve. As Fig. 16 indicates, results across the HIV treatment cascade as of December 2015 leave the world short for each component of the 90–90–90 target.

Among regions, there is considerable variation in outcomes across the cascade (Fig. 17). As these regional differences indicate, regions often face different obstacles to improved outcomes on the ultimate test of viral suppression. For example, while countries in the Asia and Pacific region have had much greater success than those in East and Southern Africa in reaching people living with HIV with testing services, substantial gaps in linkage to care and treatment success result in viral suppression rates in Asia and the Pacific that are markedly lower than in the high-burden countries in East and Southern Africa. Similar post-diagnosis gaps are even more evident in Eastern Europe and Central Asia,

where 67% of people living with HIV know their HIV status but only 19% are virally suppressed. Likewise, given that 86% of people living with HIV in Western and Central Europe and North America know their HIV status, the fact that only 47% of people living with HIV have achieved viral suppression suggest that substantial improvements are needed in linking HIV-positive individuals with sustained antiretroviral therapy. In the high-prevalence region of West and Central Africa, poor results on the first 90 appear to be the single most substantial obstacle, with only 36% of people living with HIV aware of their HIV status in 2015.

The First 90

In 2015, an estimated 57% of people living with HIV worldwide knew their HIV status. To reach the target of 90% knowledge of HIV status among people living with HIV in 2020, the share of people living with HIV who have been diagnosed needs to increase by 6-7% per year over the next five years. The need to strengthen testing and case-finding efforts and to accelerate the pace of testing scale-up is evident.

According to monitoring by IAPAC and a separate analysis by another team of researchers, 70% or more of people living with HIV currently know their HIV status in 16 of 52 countries with available estimates, as well as in the British Columbia province of Canada (Fig. 17)*(11).* While most of the countries with the highest levels of known HIV status are high-income countries with mature HIV testing and treatment programmes, 70% or more of people living with HIV know their HIV status in several low- and middle-income countries, including Brazil, Viet Nam, Cuba and Kyrgyzstan (Fig. 16)*(11).*

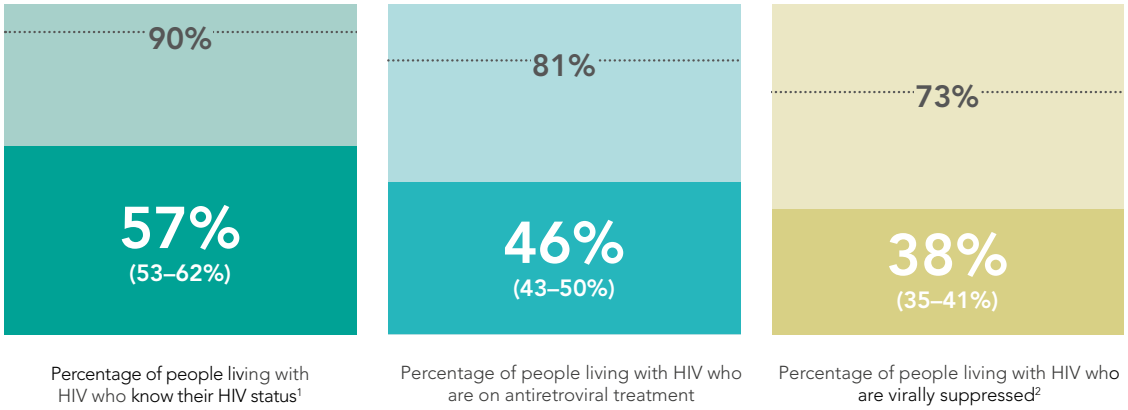
Investments in HIV testing services are bearing fruit. In 2015 alone, PEPFAR supported more than 45 million HIV tests, yielding a seropositivity rate of 4.1%. The Government of China, having prioritized efforts to make HIV testing more accessible, is now responsible for supporting one in three HIV tests globally*(45).*

However, much greater investments in HIV testing services and much better results will be needed to reach the goal of 90% knowledge of HIV status among people living with HIV. Intensifying testing efforts is especially critical in regions where knowledge of HIV status among people living with HIV is the lowest – in the Middle East and North Africa (37%) and West and Central Africa (36%).

A key challenge for testing efforts is to overcome the legacy of earlier approaches to HIV treatment, whereby antiretroviral therapy was reserved only for the sickest patients, with initiation of treatment contingent in earlier years upon an individual's CD4 count. This approach inadvertently discouraged many people from seeking HIV testing, by suggesting that treatment was only appropriate for the very sick. Making the treat-all approach a reality will demand not only urgent training of health care providers but also community education initiatives to spread the word that HIV treatment is for all people who are diagnosed and that all persons at risk of HIV should take immediate steps to learn their HIV status. (Importantly, recent experience in South Africa demonstrates that changing policy to initiate HIV treatment in patients at earlier stages of HIV infection does not reduce access to HIV treatment for sicker patients)*(73).*

Figure 15

Global results: HIV treatment cascade, 2015



Percentage of people living with HIV who know their HIV status[1]

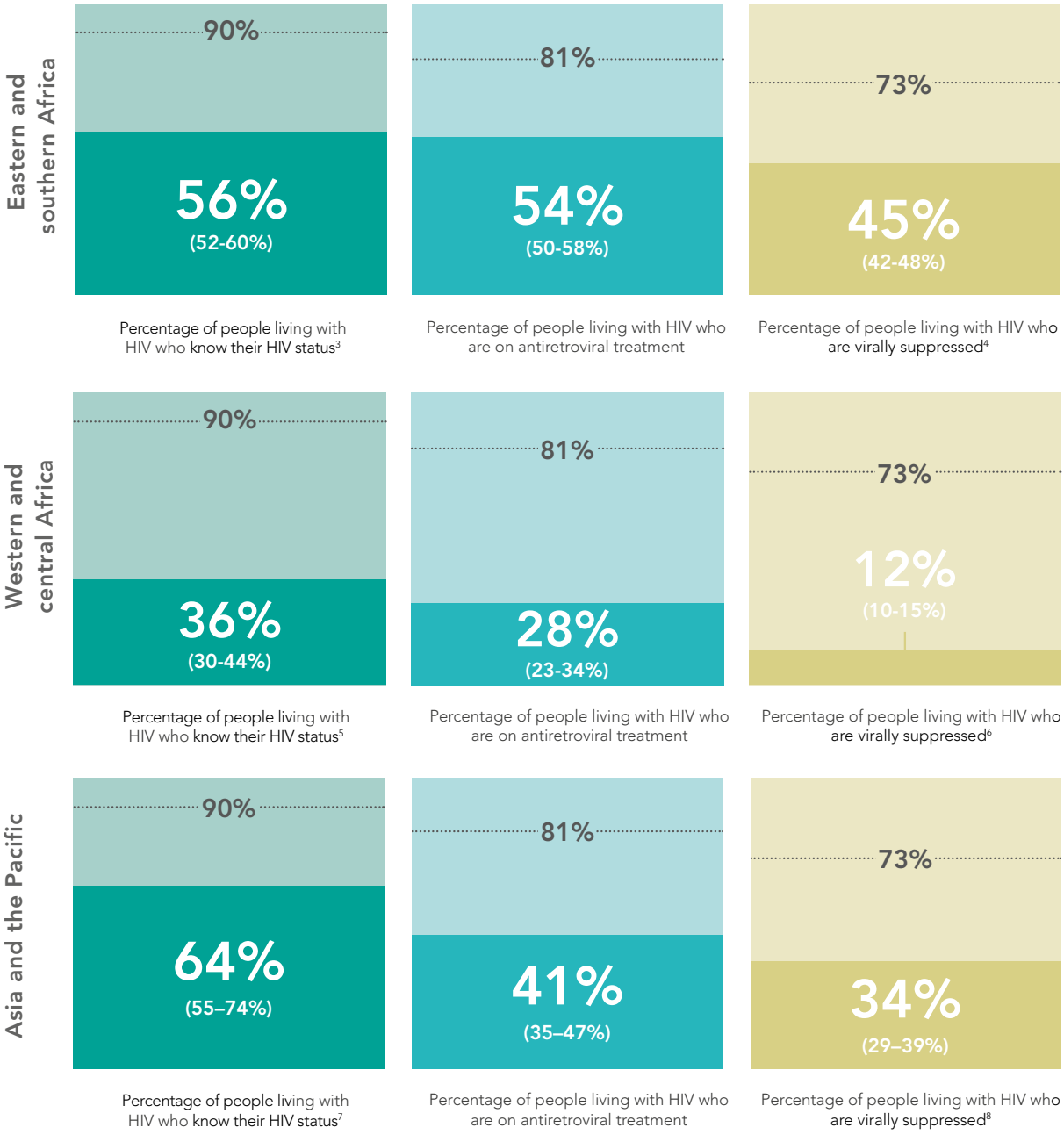
Percentage of people living with HIV who are on antiretroviral treatment

Percentage of people living with HIV who are virally suppressed[2]

*See explanatory notes

Figure 16

HIV treatment cascade, 2015



Percentage of people living with HIV who know their HIV status[3]

Percentage of people living with HIV who are on antiretroviral treatment

Percentage of people living with HIV who are virally suppressed[4]

Percentage of people living with HIV who know their HIV status[5]

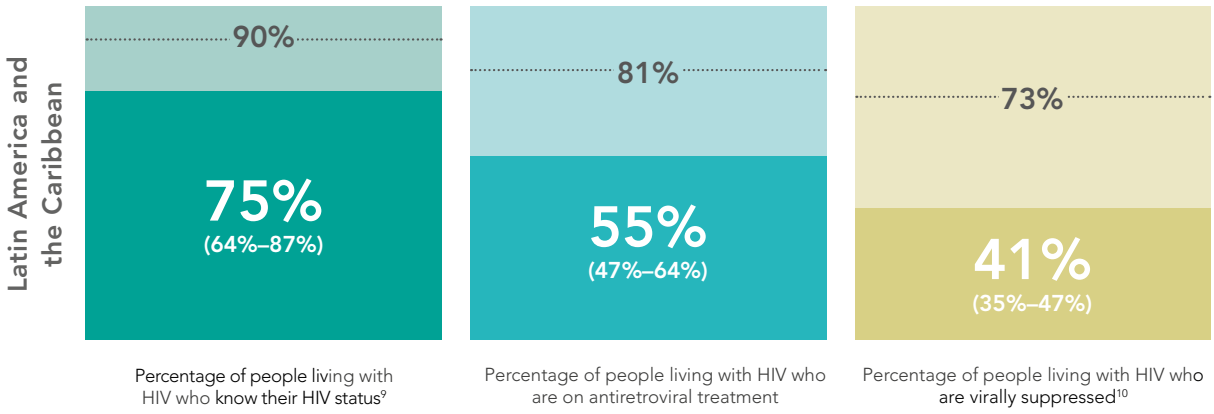
Percentage of people living with HIV who are on antiretroviral treatment

Percentage of people living with HIV who are virally suppressed[6]

Percentage of people living with HIV who know their HIV status[7]

Percentage of people living with HIV who are on antiretroviral treatment

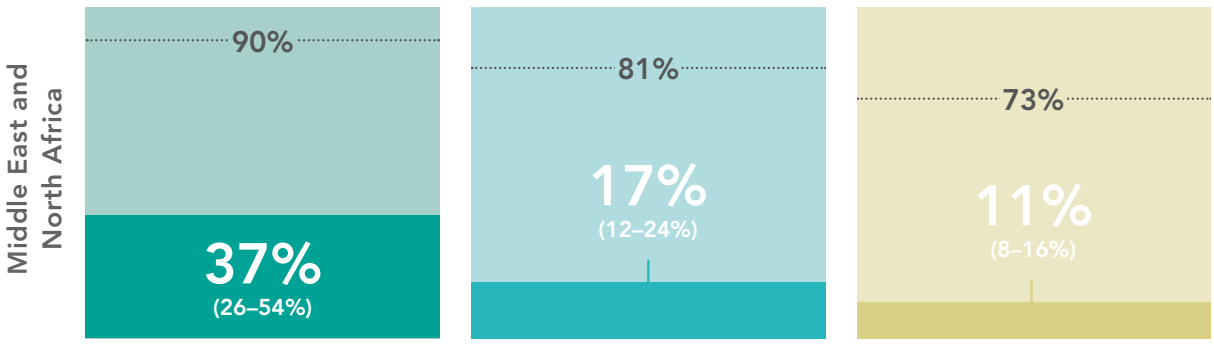
Percentage of people living with HIV who are virally suppressed[8]



Percentage of people living with HIV who know their HIV status[9]

Percentage of people living with HIV who are on antiretroviral treatment

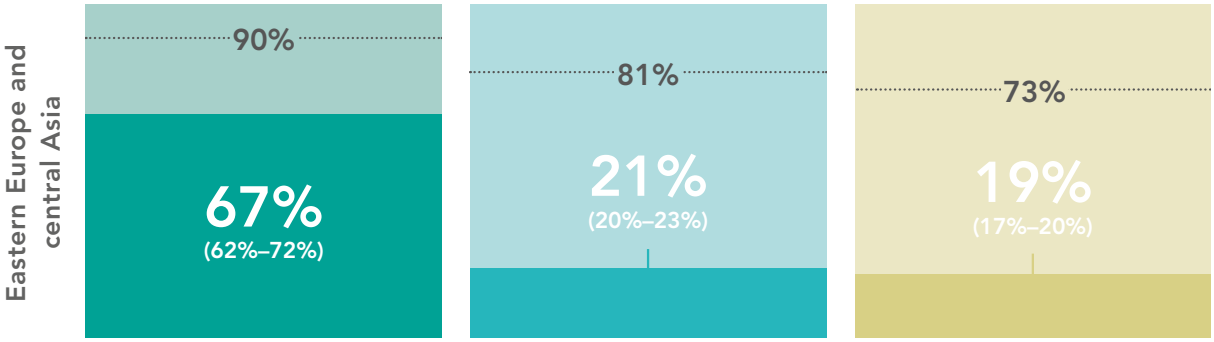
Percentage of people living with HIV who are virally suppressed[10]



Percentage of people living with HIV who know their HIV status[11]

Percentage of people living with HIV who are on antiretroviral treatment

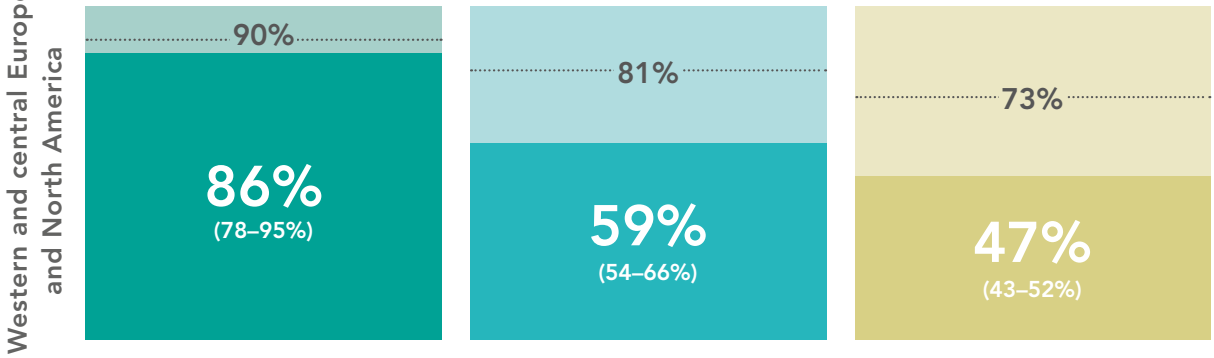
Percentage of people living with HIV who are virally suppressed[12]



Percentage of people living with HIV who know their HIV status[13]

Percentage of people living with HIV who are on antiretroviral treatment

Percentage of people living with HIV who are virally suppressed[14]



Percentage of people living with HIV who know their HIV status[15]

Percentage of people living with HIV who are on antiretroviral treatment

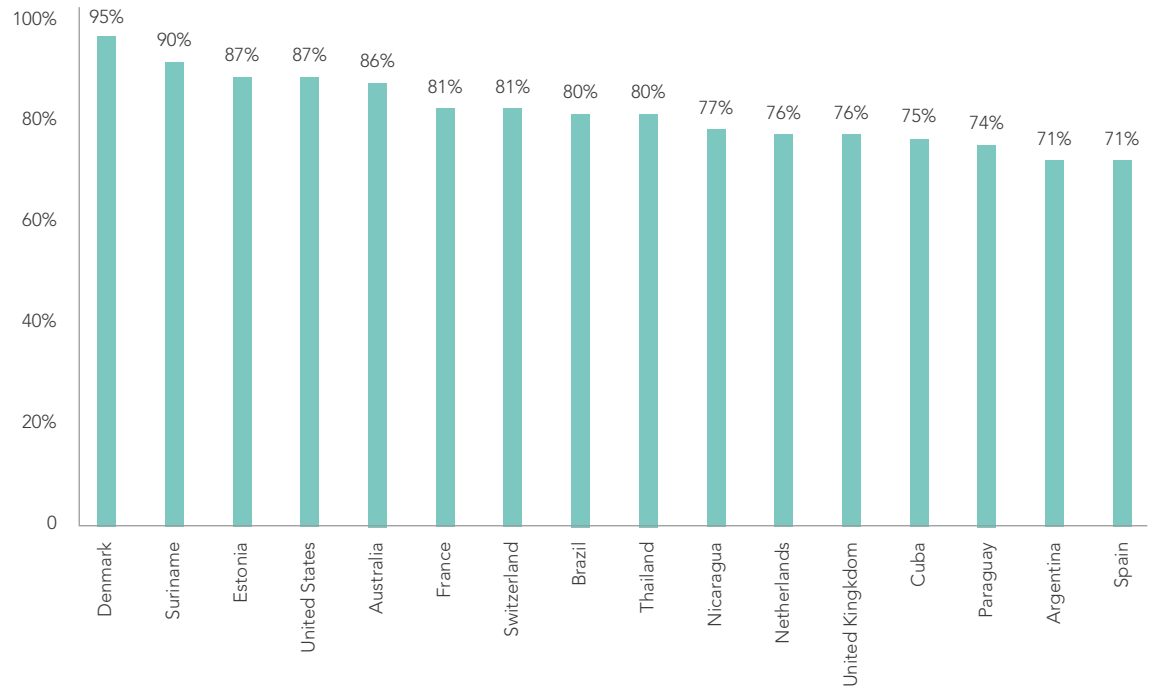
Percentage of people living with HIV who are virally suppressed[16]

**See explanatory notes

UNAIDS special analysis, 2016. For more details, please refer to the Prevention Gap Report annex on methodology http://www.unaids.org/en/resources/documents/2016/prevention-gap

Figure 17

Countries reporting 70% or more knowledge of HIV status among people living with HIV, 2000–2015



Source: IAPAC, www.hiv90–90–90watch.org

All countries urgently need to adopt WHO's 2015 guidelines on HIV Testing Services and take steps to bring innovative technologies and strategies to scale. Countries must be prepared to take immediate steps to implement anticipated WHO guidelines on self-testing and to roll out point-of-care tests for early infant diagnosis. Budget reallocations are also urgently required to shift support to the many innovative community-based models that have proven so effective in reaching vulnerable individuals and communities with HIV testing services.

The Second 90

To reach the 90–90–90 target, HIV treatment coverage will need to rise from 46 [43-50]% globally in 2015 to 81% by December 2020. If the current pace of scale-up continues, it is estimated that 27 million people will obtain antiretroviral therapy in 2020 – short of the 90–90–90 target of 30 million on HIV treatment. Regionally, HIV treatment coverage is highest in Western and Central Europe and North America (59 [54-66]% in 2015), Latin America and the Caribbean (55 [47-64]%), East and Southern Africa (54 [50-58]%), and Asia and the Pacific (41 [35-47]%), with much lower coverage in other regions (28 [23-34]% in West and Central Africa, 21 [20-23]% in Eastern Europe and Central Asia, and 17 [12-24]% in the Middle East and North Africa).

Although the pace of scale-up must accelerate if we are to reach 90–90–90, there is much good news to celebrate as well as considerable grounds for optimism. For the first time, more people in Africa are initiating HIV treatment than are becoming infected with HIV – a tectonic shift in the AIDS response. As of 2015, at least 24 countries worldwide had achieved HIV treatment coverage of 60% or greater, positioning them well to reach the 81% coverage threshold for the 90–90–90 target by 2020.

Countries that have already achieved very high treatment coverage include some of those most heavily affected by HIV. In 2015, treatment coverage was 78 [73-83]% in Botswana, 61 [56-66]% in Malawi, 69 [63-74]% in Namibia, 79 70-87]% in Rwanda, 63 [59-66]% in Zambia and 62 [56-67]% in Zimbabwe. Several low-income countries have already reached the 60% threshold for treatment coverage and are trending upwards: Cambodia, Eritrea, Malawi, Rwanda and Zimbabwe.

Ensuring that the pace of scale-up is sufficient to reach 30 million people by 2020 will require that we build on these gains and also capitalize on new opportunities to expedite treatment uptake. In particular, the move to a treat-all approach has the potential to facilitate swifter treatment uptake, as clinicians no longer have to wait for a CD4 result to recommend treatment or advise clients with higher CD4 counts to defer starting therapy. In two public sector clinics in South Africa, initiating antiretroviral therapy at the patient's first clinic visit increased treatment uptake by 36% and viral suppression by 26%*(74)*.

Further decentralization of services, task shifting and greater reliance on well-resourced nurses and community lay workers will be needed to bring HIV treatment to those who need it. The scale-up of innovative service delivery strategies, such as community distribution of antiretroviral therapy and peer-based support groups, must accelerate.

Health providers and community advocates should also redouble efforts to emphasize the prevention benefits of HIV treatment. In a major clinical trial in the Bronx borough of New York City and Washington, D.C., participants who received antiretroviral therapy had limited knowledge regarding the role of antiretroviral therapy in reducing the risk of transmission to partners*(75)*. Educating and counselling people living with HIV regarding the prevention impact of HIV treatment can provide yet another motivation for

individuals to remain engaged in care and adhere to prescribed treatment regimens.

The Third 90

Experience demonstrates that very high levels of viral suppression – the ultimate aim of HIV treatment – are feasible in diverse settings. In Rwanda, 82% of antiretroviral therapy patients in 2013 were virally suppressed*(14)*, and viral load testing of more than 301 000 samples in PEPFAR-supported programmes in Uganda generated a suppression rate of 91%. In the U.S., where rates of viral suppression have lagged, 78% of patients on antiretroviral therapy were virally suppressed in 2013, with 68% of patients exhibiting durable viral suppression over multiple tests*(76)*. In at least seven of the 52 countries with reported treatment cascade figures analysed by IAPAC and a separate European research team, more than 50% of people living with HIV are virally suppressed. Viral suppression rates are especially impressive in East and Southern Africa, with more than 80% of all people receiving antiretroviral therapy achieving viral suppression in 2015. However, these setting-specific successes need to be extended across the world, as WHO in 2015 reported that only about 45% of adults who initiate antiretroviral therapy worldwide remain virally suppressed after three years*(19)*.

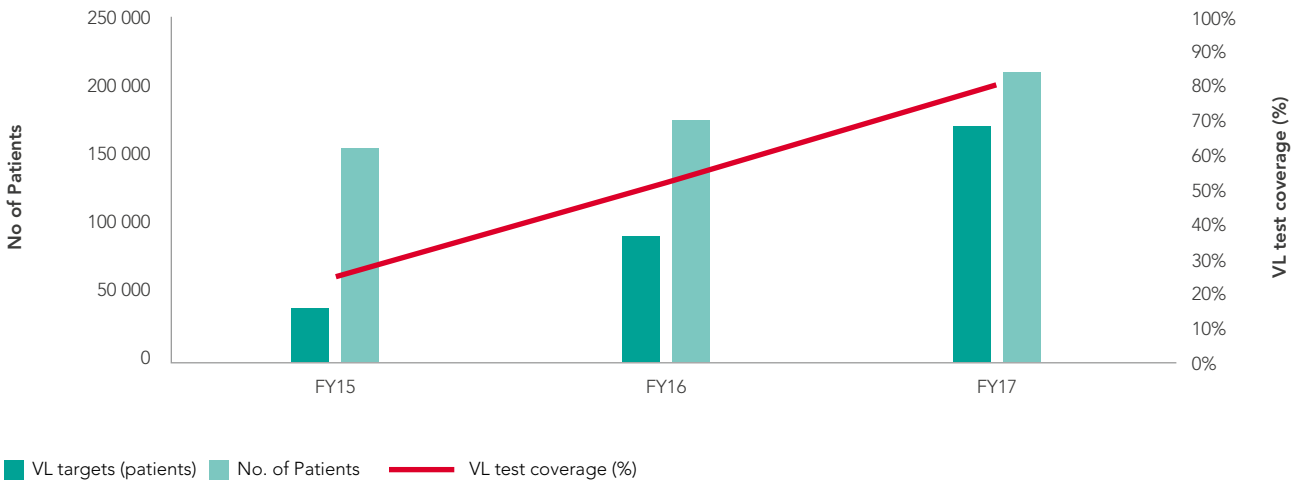
There are signs that treatment programmes over time can become more successful in achieving high rates of viral suppression. Rates of viral suppression in the United States have dramatically increased in recent years, roughly tripling between 1997 and 2014*(77)*. In one programme for men who have sex with men in the British Columbia province of Canada, a clear trend towards increased and very high viral suppression was detected from 2012 to 2015*(78)*.

Concerted efforts are needed to expand access to viral load testing. According to CHAI, Brazil, Botswana, South Africa and Thailand already have well-advanced programmes for viral load testing, with viral load uptake rapidly rising as well in Kenya, Uganda and Zimbabwe. Other countries – such as Ethiopia, Malawi, Rwanda, Swaziland and the United Republic of Tanzania – are working to develop and roll out viral load monitoring programmes. Some countries, such as Lesotho, are establishing targets to guide and accelerate scale-up of viral load testing (Fig. 18). In Cameroon, the Ministry of Health has developed a national strategy for viral load scale-up. PEPFAR has committed to provide one viral load test per year for all patients in PEPFAR-supported treatment programmes, and the Global Fund has increased financing for HIV diagnostic commodities such as viral load testing over the last two years. Even with this progress, CHAI projects a gap of more than 200 viral load testing platforms in 2020 to meet the testing needs associated with 90–90–90.

Helping people living with HIV remain engaged in care is essential to sustaining viral suppression. Achieving extremely high rates of retention in care is feasible; among 103 countries reporting 12-month antiretroviral therapy retention data in 2015 through the Global AIDS Response Reporting system, 12 achieved retention of 95% or greater, with an additional 13 countries reporting retention of 90-94%. However, national reports for 2015 also

Figure 18

Viral load results for 2015 and scale-up targets for 2016-2017, Lesotho



Source: PEPFAR, 2016.

highlight considerable room for improvement, as 13 countries had 12-month retention rates below 70%.

There are also signs that estimates of discontinuity of HIV care may have inadvertently overstated the extent of the problem, as clinic-specific monitoring may erroneously classify as lost to follow-up cases of individuals who are obtaining care elsewhere. In the Gauteng province of South Africa, for example, a manual search of the national health database found that many pregnant women categorized as lost to follow-up were actually receiving continuous HIV care at a clinical site separate from the one where they initiated therapy*(80)*. The challenges associated with tracking actual retention in care underscore the need for coordinated, comprehensive systems for patient monitoring and follow-up.

Community-centred strategies, including increased use of community health workers, can increase retention in care. Use of lay counsellors in HIV treatment programmes supported by Médicins Sans Frontières resulted in 95.4% viral suppression at six months. Likewise, peer-run adherence clubs have been found to reduce loss to follow-up by 57%*(49)*.

Particular focus is required to improve paediatric treatment success rates. Among children in Mozambique starting first-line antiretroviral therapy,

"Use of lay counsellors in HIV treatment programmes supported by Médicins Sans Frontières resulted in 95.4% viral suppression at six months."

with a median time on treatment of 8.5 years, 35.9% experienced virologic failure*(81)*. PEPFAR has similarly reported high rates of virologic failure among children receiving antiretroviral therapy through PEPFAR-supported programmes.

Late diagnosis appears to be the primary reason for sub-optimal clinical results, but discontinuity of care also contributes to paediatric treatment failure. According to a study involving 17 000 children receiving antiretroviral therapy in four African countries, 51% of children who were enrolled in HIV treatment before their first birthday were lost to follow-up within 24 months*(82)*. Recent experience indicates that robust retention is feasible for children living with HIV. In 2013-2015, as paediatric HIV treatment was brought to scale in Uganda, 84% retention in care was reported among children under age 2, with retention for children 2-5 ranging from 84% to 87%. Strong retention in care among children living with HIV in Uganda has translated into high levels of viral suppression, with 84% of paediatric HIV treatment patients in 2015 achieving viral suppression.

Accelerating gains in low-coverage settings

Although the global picture of HIV treatment scale-up is promising, these gains are not equally shared. As noted, regional treatment coverage continues to lag in West and Central Africa, the Middle East and North Africa, and Eastern Europe and Central Asia (Fig. 19).

Rejecting a "two-speed" approach to HIV treatment in sub-Saharan Africa, UNAIDS has called on countries in Western and Central Africa to triple the rate of initiation of antiretroviral therapy within the next three years. With the support of UNAIDS and WHO, stakeholders from West and Central Africa have joined together to develop an action plan for rapid implementation of the treat-all approach recommended by WHO.

Amidst disappointing coverage for the West and Central Africa region as a whole*(83)*, some countries in the region have demonstrated the feasibility of rapidly increasing treatment coverage. In 2015, 55 [45-57]% of all people living with HIV in Burkina Faso obtained antiretroviral therapy – a level of coverage substantially higher than the global average (46 [43-50]%). Supported by the doubling of domestic investment in HIV treatment services, HIV treatment coverage in Côte d'Ivoire increased from 23 [20-26]% in 2012 to 35 [30-40]% in 2015, while coverage in Gabon nearly doubled from 32 [28-36]% in 2012 to 58 [49-67]% in 2015. The pace of increase in treatment coverage is also encouraging in Senegal, where the proportion of people living with HIV receiving antiretroviral

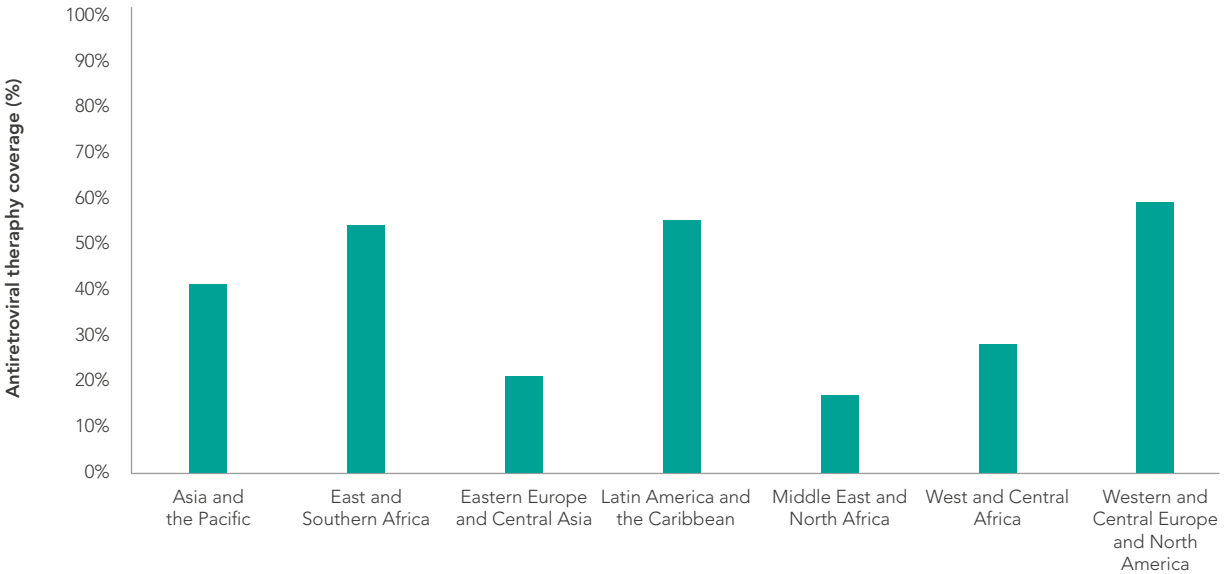
therapy rose from 26 [22-32]% in 2012 to 40 [34-49]% in 2015.

Since the launch of 90–90–90 two years ago, it has become increasingly clear that rapid scale-up in treatment access is possible in countries and regions where progress has previously been far too slow. For example, some countries in Eastern Europe and Central Asia, while beginning at a very low level, sharply increased treatment overage from 2012 to 2015 in such countries as Kazakhstan, Kyrgyzstan, Latvia, the Republic of Moldova and Tajikistan. In Uzbekistan, especially swift treatment scale-up has occurred, with treatment coverage rising from 14 [10-21]% in 2012 to 40 [30-58]% in 2015.

Increasing treatment coverage can be especially challenging in fragile states, yet here too there is evidence that focus and commitment can generate rapid increases in treatment coverage. In only three years (2012-2015), HIV treatment coverage more than doubled in the Democratic Republic of Congo (from 16 [13-30]% to 33 [26-40]%); while the starting point for these increases was extremely low, a similar pace of scale-up over the next five

Figure 19

HIV treatment coverage by region, 2015



Source: UNAIDS estimates, 2016.

years would enable the Democratic Republic of Congo to approach the 81% coverage target required by 2020.

Within countries, HIV treatment coverage may vary considerably within and among provinces and districts. The generation and timely use of granular epidemiological and service utilization data to inform resource allocation and programmatic focus is critical to ensure equitable access among all locations.

Ensuring that no population is left behind

The 90–90–90 target is universal in its scope. To reach 90–90–90, every population affected by HIV must be engaged in the global effort to end AIDS as a public health threat.

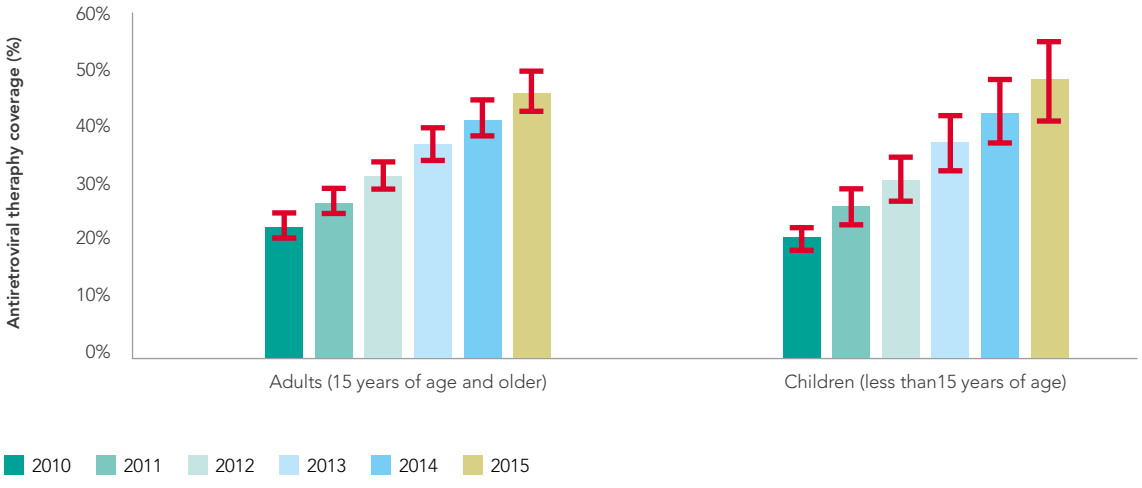
Children

For many years, HIV treatment coverage was higher among adults than among children. However, this has begun to change in recent years. In 2015, HIV treatment coverage was actually higher among children (49%) than among adults (46%) (Fig. 20).

However, coverage figures can be deceiving with respect to children living with HIV, who confront 50% odds of dying by their second birthday in the absence of antiretroviral therapy, with peak mortality occurring at 6-8 weeks *(84) (85)*. Tragically, far too many children living with HIV

Figure 20

Antiretroviral theraphy coverage (%) among people living with HIV: adults and children



Source: UNAIDS estimates, 2016.

die at a very early age. In 2015, while children accounted for only 5% of all people living with HIV, they made up 10% of all AIDS-related deaths. Thus, a key reason why the coverage gap between adults and children has been closed is that far too many children die before HIV treatment can be started.

Over the last several years, relative inattention to the treatment needs of children living with HIV has given way to new energy and commitment among diverse partners. In the 2014, PEPFAR joined with the Children's Investment Fund Foundation (CIFF) to launch the Accelerating Children's HIV/AIDS Treatment (ACT) initiative, a two-year effort that aims to double the number of children receiving antiretroviral therapy in nine high-burden countries. In its first full year of operation, the ACT initiative provided antiretroviral therapy to 489 000 children, putting the initiative on track to reach its 2017 target of 600 000 children on HIV treatment*(86)*. To further accelerate progress towards addressing the HIV-related needs of children and young people, UNAIDS in 2016 has joined with PEPFAR and other partners to launch Start Free Stay Free AIDS Free, a super-Fast-Track framework that aims to end AIDS among children, adolescents and young women by 2020 through rapidly scaled-up HIV prevention and treatment services.

Increasing the proportion of children who are diagnosed early will be essential to improve outcomes for children living with HIV. In 2015, only 51% of HIV-exposed children in the 21 high-burden countries that account for 90% of new HIV infections among children received early infant diagnostic services within the first two months of life – a coverage level that was essentially unchanged from 2014*(87)*.

By expanding diagnostic sites and by intensifying programme management and monitoring, some countries are reporting important progress in increasing coverage of early infant diagnosis. In Uganda, for example, the proportion of HIV-exposed infants who receive early infant diagnostic testing rose from 46% in 2012 to 58% in 2014.

In addition to strengthening and accelerating early infant diagnostic efforts, including through vigorous use of emerging innovations, much stronger efforts are needed to increase testing opportunities for older children who have 'fallen through the cracks' with respect to measures to prevent perinatal transmission. In 2015, breastfeeding accounted for a majority of newly infected children in 2015, as the average age of HIV acquisition for children has increased over time. In addition, a notable share of children exposed to HIV are missed by services to prevent mother-to-child transmission, underscoring the importance of diversifying testing options and strategies for older children.

Intensified HIV testing efforts will need to coupled with continued work to optimize antiretroviral therapy options for children, including the development of a wider array of child-appropriate regimens, and effective service delivery strategies, such as more effective monitoring of mother-infant pairs.

Adolescents and young people

More than an estimated 1.8 million young people between ages 10 and 19 – 80% of them in sub-Saharan Africa – are living with HIV. Adolescents living with HIV include both young people with perinatally acquired HIV infection who age into adolescence, as well as the considerable number of adolescents who are newly infected with HIV each year*(88)*.

Current testing and treatment efforts are leaving many adolescents living with HIV behind. While AIDS-related deaths globally have steadily fallen for more than a decade as a result of expanded access to antiretroviral therapy, deaths among adolescents living with HIV have doubled since 2000. Today, AIDS remains a leading cause of death among adolescents in Africa and the second leading cause of adolescent death globally*(89)*.

It is estimated that less than one in three adolescents living with HIV know their HIV status, and adolescents also experience poorer results than adults across subsequent stages of the HIV treatment cascade*(90)*. In a recent population-based survey in KwaZulu-Natal, South Africa, 44% of people ages 15-24 years were unaware of their HIV status*(91)*. Services specifically designed to address the needs of adolescents are needed to help close these outcome gaps, and policy barriers, such as age-of-consent laws for health care services, should be removed to ensure young people's equitable access to testing and treatment services.

While the current performance of programmes for adolescents is discouraging, evidence also suggests that community-centred, youth-appropriate programmes can generate excellent results for young people. In Uganda and Kenya, for example, a hybrid mobile testing strategy in 32 communities achieved 88% knowledge of HIV status among more than 116 000 adolescents*(92)*. A separate programme in Uganda providing service vouchers to young people reached nearly 30 000 young people with sexual and reproductive health services over a 12-month period, with 92% of those receiving HIV testing services*(48)*. In Zimbabwe, a community-based programme using young people (ages 17-23) to support children and young people in accessing HIV services reached more than 5 000 young people with HIV services and increased treatment adherence rates by more than 50%*(48)*.

Men in sub-Saharan Africa

In the push to expand access to antiretroviral therapy, men living with HIV are often missing. In South Africa, men receiving antiretroviral therapy have been shown to have poorer survival than female HIV treatment patients*(93)*. More recently, according to surveillance figures in rural South Africa, the survival gap between male and female antiretroviral patients has grown*(94)*.

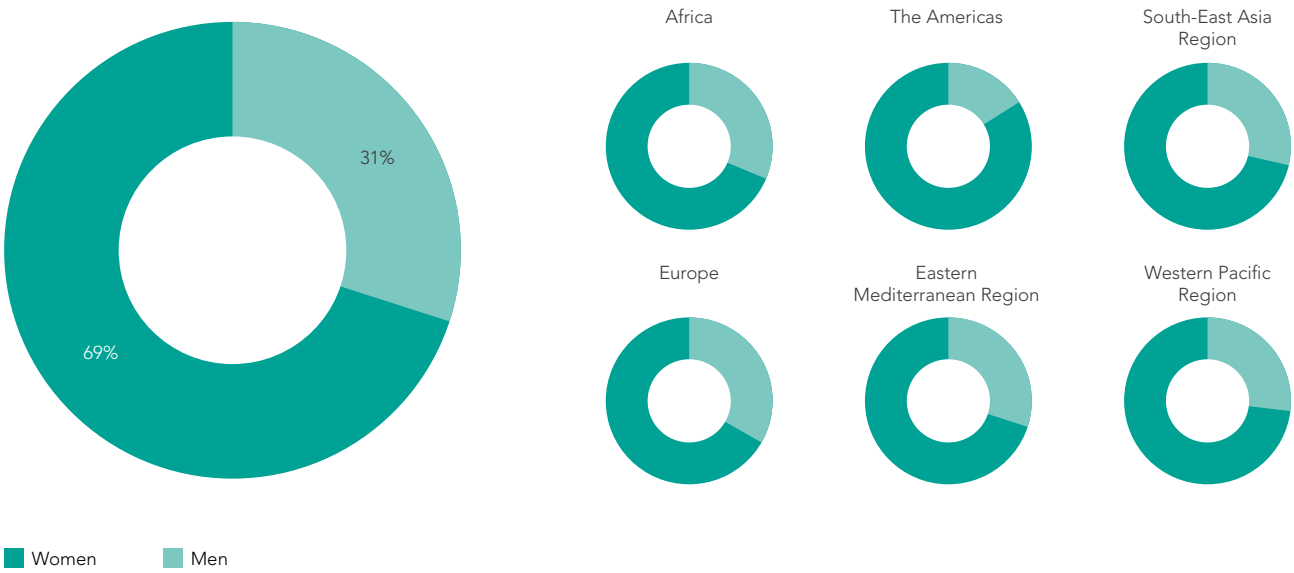
These substantial, growing disparities in HIV-related health outcomes among men and women can be traced to sub-optimal results for men at each stage of the HIV treatment cascade. Globally, women represent nearly 70% of all people who receive HIV testing services (Fig. 21) *(7)*. This imbalance at least partly reflects the fact that many women are routinely offered HIV testing services during pregnancy, an option not available for men. In 2011, over half of the HIV-related deaths among men in rural South Africa were in men who had never sought HIV care*(94)*.

Among those who are diagnosed with HIV, men are also less likely than women in many settings to receive antiretroviral therapy. Globally, HIV treatment coverage among women in 2015 was 52 [48-57]%, compared to 41 [33-49]% among men.

A multicentre cohort study in South Africa found that male HIV treatment patients were 20% more likely to fall out of care than female patients*(93)*.

These disparities underscore the need for innovative approaches specifically tailored to men's needs. In the Cape Town metropolitan area, five HIV clinics specifically for men are now in operation*(95)*. The SEARCH project in 32 rural communities in Uganda and Kenya has had success with a similar approach, offering men-only tents in their hybrid mobile programme where men are able to seek counselling and support about sexual and other health issues.

Figure 21
Total of adults (15+) who received HIV testing services, proportion men and women by WHO region, 2014



Source: GAPR (WHO, UNAIDS,UNICEF) 6 July 2014, 76 reporting countries.

Key populations

Recent studies confirm that fully leveraging the benefits of HIV treatment is vital to hopes for ending the epidemic among key populations*(96)*. However, it will be impossible to reach 90–90–90 among key populations without urgent action to address the many barriers that these groups face in accessing testing and treatment services.

Although reliable figures are not available for testing and treatment coverage for key populations in most settings, available evidence indicates that members of key populations are often far less likely to obtain essential services than the general population*(97)*. A key reason why service uptake is so inadequate among key populations is the persistence of often-severe stigma and discrimination, reflected and reinforced in many settings by laws that criminalize the behaviours of key populations*(97)*. As noted below in the broader discussion of stigma and discrimination, removal of discriminatory laws and policies is essential to ensure that the 90–90–90 agenda works for key populations.

Strategies to close gaps in the HIV treatment continuum for key populations need to be tailored to the specific needs of specific populations. As PEPFAR has monitored service cascades for key populations in high-burden countries in sub-Saharan Africa, it has found that different key populations often confront different barriers. For example, while knowledge of HIV status is often high among sex workers in PEPFAR countries in sub-Saharan Africa, linkage to care is frequently sub-optimal. By contrast, the primary barrier for men who have sex with men in sub-Saharan Africa is lack of knowledge of HIV status, stemming from under-utilization of testing services due to conditions of stigma and discrimination. Strategic efforts to increase the proportion of people in key populations who are virally suppressed will need to address the specific factors that impede good results for specific groups.

Given the barriers that members of key populations face in accessing mainstream health services, involving community-based organizations of key populations in service delivery is essential to close service gaps. In Georgia, the Georgian Harm Reduction Network's outreach and testing programmes contributed to a 10-fold rise from 2012 to 2015 in the number of people accessing HIV testing services*(48)*. The Tangerine Community Health Centre in Thailand, designed in partnership with the transgender community, aims to enrol 1 000 transgender clients in HIV services over two years. [48] In Portugal, Checkpoint LX, the first community-based HIV testing service tailored to the needs of men who have sex with men, has transformed HIV testing efforts in the country, identifying more than 26% of all new HIV diagnoses among men who have sex with men nationwide in 2014*(48)*.

Removing social and structural barriers to treatment scale-up

Even where HIV testing and treatment services are theoretically available, many cannot meaningfully access them due to social and structural factors. For example, although surveys indicate that HIV-related stigma has declined*(29)*, far too many people living with HIV are deterred from seeking HIV testing and other health services due to fears that they will be

mistreated, ostracized or incarcerated. A recent community-led research project, which interviewed people living with HIV in Cambodia, China, Myanmar and Viet Nam, found a disturbingly high prevalence of reported discriminatory practices in health care settings*(98)*.

One of the most powerful anti-stigma strategies available is to invest further in treatment scale-up, as increases in treatment coverage are associated with declines in stigmatizing attitudes towards people living with HIV*(29)*. However, additional approaches will be needed to ensure that stigma and discrimination do not impede efforts to achieve 90–90–90. Urgent efforts are needed to train and sensitize health care workers to provide appropriate, non-discriminatory services to all people living with HIV. National reporting and enforcement mechanisms for human rights violations should be strengthened.

Legal and policy reform will be critical if the world hopes to reach 90–90–90 and ensure equitable access to life-saving services. In particular, laws that criminalize HIV transmission, exposure or non-disclosure are incompatible with the rights-based approach required to accelerate treatment scale-up, as such laws create a disincentive for people to learn their HIV status and also fail to recognize that antiretroviral therapy effectively blocks onward transmission. Policies that withhold or impede treatment services to migrants also must be removed, and steps are urgently needed to ensure that prisoners have full and equitable access to HIV testing, treatment and other essential services.

Criminal laws targeting key populations – such as sodomy laws, criminalization of various aspects of sex work, and criminalization of the possession of illicit drugs – must be repealed to remove barriers to service uptake for marginalized groups at elevated HIV risk. Over the last two years, countries have demonstrated the feasibility of treatment-enhancing legal reform. In 2015, for example, Mozambique repealed its law prohibiting same-sex relations, and Malawi suspended enforcement of its sodomy law. To remove barriers that slow progress towards 90–90–90, other countries now need to display similar courage by eliminating legal and policy barriers that diminish access to essential HIV services.

Capitalizing on the historic opportunity to end AIDS: The urgency of action

For nearly 35 years, the world has grappled with an epidemic that for most of its time appeared impervious to control. Today, we know not only that we can control the epidemic, but also that we can make the epidemic a thing of the past.

However, wishing for a world without an AIDS epidemic will not make this vision a reality. We must act – using the passion and commitment that have proven so potent in the past, the technologies and service delivery strategies we know to be effective, and the spirit of innovation needed to close gaps towards each of the three 90s. National governments will need to lead the way forward towards 90–90–90, fully leveraging the comparative advantages and added value of diverse stakeholders, including but not limited to the private sector.

As we work towards achieving the 90–90–90 target, we must in many respects go "back to the future". Today's potential to end the epidemic once and for all can be traced back to the foundation laid in the earliest days of the epidemic, when communities vigorously confronted denial and inaction and put into motion what would become known as the AIDS response. To reach the 90–90–90 target, communities will again need to be at the centre of the response – in this case, by delivering testing and treatment services, by continuing to innovate, and by holding stakeholders accountable for results.

Only a genuine partnership – combining the energy, know-how and commitment of communities, governments, health care providers, private industry and other vital stakeholders – will enable us to reach 90–90–90 and arrive at our ultimate destination of a world without an AIDS epidemic.

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Global:

1. 2015 measure derived from data reported by 87 countries, which accounted for 84% of people living with HIV worldwide.

2. 2015 measure derived from data reported by 86 countries. Globally, 22% of all people on antiretroviral therapy were reported to have received a viral load test during the reporting period.

Eastern and southern Africa:

3. 2015 measure derived from data reported by 8 countries, which accounted for 14% of people living with HIV in the region.

4. 2015 measure derived from data reported by 86 countries. Regionally, 22% of all people on antiretroviral therapy were reported to have received a viral load test during the reporting period.

Western and central Africa:

5. 2015 measure derived from data reported by 12 countries, which accounted for 73% of people living with HIV in the region.

6. 2015 measure derived from data reported by 7 countries. Regionally, 2% of all people on antiretroviral therapy were reported to have received a viral load test during the reporting period.

Asia and the Pacific:

7. 2015 measure derived from data reported by 16 countries, which accounted for 93% of people living with HIV in the region.

8. 2015 measure derived from data reported by 15 countries. Regionally, 29% of all people on antiretroviral therapy were reported to have received a viral load test during the reporting period.

Latin America and the Caribbean:

9. 2015 measure derived from data reported by 15 countries, which accounted for 76% of people living with HIV in the region.

10. 2015 measure derived from data reported by 21 countries. Regionally, 77% of all people on antiretroviral therapy were reported to have received a viral load test during the reporting period.

Middle East and North Africa:

11. 2015 measure derived from data reported by 7 countries, which accounted for 77% of people living with HIV in the region.

12. 2015 measure derived from data reported by 8 countries. Regionally, 41% of all people on antiretroviral therapy were reported to have received a viral load test during the reporting period.

Eastern Europe and Central Asia:

13. 2015 measure derived from data reported by 11 countries, which accounted for 98% of people living with HIV in the region.

14. 2015 measure derived from data reported by 11 countries. Regionally, 77% of all people on antiretroviral therapy were reported to have received a viral load test during the reporting period.

Western and central Europe and North America:

15. 2015 measure derived from data reported by 14 countries, which accounted for 83% of people living with HIV in the region.

16. 2015 measure derived from data reported by 16 countries. Regionally, 44% of all people on antiretroviral therapy were reported to have received a viral load test during the reporting period.

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